RAILROAD GAZETTE

FRIDAY, SEPTEMBER 5, 1902.

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## Contributions

### Government Regulation of Working Hours.

London, Aug. 19, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your issue of August 8, in discussing a collision in North Dakota (page 627), where a driver had been on duty 23 hours, you speak of the doings of the British Government in connection with the hours of labor, alluding to the difficulties which surround the problem of safely regulating this feature of railroad service.

It may be of interest to you and your readers to know that the activities of Parliament and the Board of Trade in this matter have resulted in a real improvement in the service of English railroads; and, in fact, that this result is acknowledged by the railroads as well as by disinterested persons.

As you may remember, there was a lengthy agitation of this subject some years ago. Some of the railroad employees, especially those belonging to the Association, in conjunction with other Trade Unionists, and members of Parliament belonging to or sympathizing with the labor party, aired the subject so thoroughly in the public press that the Board of Trade took notice of the matter. The inspecting officers were instructed to note in their reports what hours were worked by witnesses coming before them in accident investigations, and to keep watch of the subject generally. In 1893 Parliament empowered the Board of Trade to call upon the railroad companies to show what hours were worked by any men, or any class of men, and the Board was authorized to take up the question in a comprehensive manner. This led to many inquiries and a number of reports to Parliament on the subject, and, as a result, no man is now employed more than 12 hours continuously. Enginemen of fast trains and signalmen in busy cabins are not allowed to work more than about eight hours. In every case now where a man is found to have been on duty more than 12 hours, and in cases where the time is even less than this if the man performs exacting duties, the inspector draws attention to the fact, even though the question of hours of duty has nothing to do with the particular accident under investigation.

I need hardly say to you that the railroad companies have made a big fuss about the extra expense they have been put to to provide additional men to meet the requirements of shorter hours; but, in spite of this, I am justified in saying, as I have just said, that the companies admit that the change has paid them. They admit that the matter required reform. The improvement in the accident record as well as the amelioration of the conditions of the men, in many cases, may be attributed to this cause.

Evidently the Government is to exercise an increasing control over hours of labor, both in America and England. While putting statutory limits on the number of hours to be worked in a day can never be entirely satisfactory, the constant agitation for short work days in the various artisans' trades warns us that public opinion will persist in favoring the establishment of such limits. And as long as enginemen, signalmen and others must often, by reason of emergencies, work much more than their usual number of hours, it will be useless to complain if the State sets the limit too low. Fixing a man's hours at 10 or 8 per day does not, indeed, prevent him from working 12 or 15, or even 24 hours, when a fellow workman is sick, or other unexpected stress seems to compel him; but it gradually tends to mitigate the severity of these stresses; and that is a beneficial result. E. S. R.

### Board of Trade Control Over Railroads in Great Britain.

BY H. RAYNOR WILSON.

As the relations of the railroads of England to the government, and their experiences under government control, are frequently the subject of comment in America it may be of interest to put on record what this control consists of, and how the regulating body—which in nearly all things is the Board of Trade—exercises its powers.

The Board of Trade Inspecting Officers were appointed under an Act of Parliament passed in 1842, and their duties are principally divided into two heads, (1) the inspection of new lines and of alterations and additions to existing lines, and (2) holding inquiries into accidents. It will be convenient to notice the inspection work first.

Before a British railroad can construct a new line an Act for the same has to be obtained from Parliament, and one of the duties of the Board of Trade is to examine the plans deposited with such bills and to report upon all public highway crossings in order to see that the number of such crossings is not increased; also, where bridges are provided to do away with highway crossings, to see that the steepness of the incline is fair and reasonable.

After the railroad has been built the company has to send to the Board of Trade a month's notice of its intention to open the line. Ten days before opening, a second notice is sent, which has to be accompanied by a copy of the plan approved by Parliament showing in red any deviation that has been made during construction. This has to be accompanied by particulars of the various stations and the positions of the same, together with the length and height of the platforms; of the gradients and curves on the line; also particulars of all the cuttings, embankments, over and under bridges, viaducts, highway crossings (public and field crossings, bridle roads, and footways), tunnels and culverts, and aqueducts 3 ft. or more in diameter or width. In these particulars the distance from a fixed point has to be given. Details of the general character of the work on the road must then be given as follows:

*Permanent Way.*—Whether the line be double or single or partly double and partly single; the distances from the fixed point adopted in the tables, at which the single portions, if any, commence and terminate—or for a single line at which the meeting places or the sidings commence and terminate; whether the land has been purchased for a second track or whether any other arrangements have been made with a view to adding a track at a future period; the width at formation level; the gage; the space between the track, and between the main track and sidings; a description (with a diagram section) of rails employed, their length, and weight per yard; description and weight of chairs where these are employed; the mode of fixing chairs and securing rails; the fastenings adopted for the joints of rails; description of sleepers with their smallest and average scantling and length, their distance from center to center if transverse, and if longitudinal, the details of any fastenings by which they are connected; the nature of the ballast, and its depth below the under surface of the ties, the number and positions of all facing points connected with the main line; and the names of stations or other places at which engine-turntables are provided.

*Fences.*—Description of fencing adopted for the line, giving in the case of post and rail fencing the height of the top rail, and the distance between posts; and in the case of wire fencing, the height, number of wires, distance between supports, and means of straining.

*Drainage.*—General description of the drainage, and if on any part of the line it has been attended with any peculiar difficulty, details should be given.

*Stations.*—Their names and their distances at the commencement and termination, respectively from the fixed point; the gradients on which they are situated and approached; the length of the platforms; and the positions of, and distances between, the home and the distant signals. (This last information is generally given in the shape of a separate diagram showing the signaling on the whole line.)

*Width of Line.*—The minimum space allowed at and over a height of 2 ft. 6 in. above the rail level between the sides of the widest cars to be used and any fixed works, such as pillars and walls at stations, abutments, piers, supports, arches, girders, telegraph and signal posts, or sheds along the line. The minimum section of each tunnel is to be appended showing within it a section of the widest car to be used on the line.

*Viaducts and Bridges.*—Drawings in detail of all viaducts, and bridges, either over or under the railroad, accompanied by sufficient information to enable the strength of each to be ascertained by calculation, and showing by sections the distances between the girders and the sides of the widest cars to be used on the line, when the girders are more than 2 ft. 6 in. above the level of the rails. The weight of each main girder and the total weight of the superstructure (including ballast if used) of all girder spans is to be stated on the plans.

Diagrams of all junction and station arrangements, including plans and sections of the stations, platforms and approaches.

One of the Inspecting Officers is then appointed to make an inspection of the line and in due time he comes and walks over the greater part of the line, and rides over the rest. He will test all the bridges by having on each track two of the heaviest engines standing on, and running over them. He will see that all buildings, bridges, retaining walls, signals, telegraph posts, platform columns, etc., are outside the structure gage; that accommodation is provided for passengers, and that there are clocks at the stations, and efficient lighting. The officer will then try the interlocking, will see that all the signals are fixed in suitable positions, and that the towerman has a good view of the lines he controls. He will take care that the requisite block instruments are provided and electrical repeaters for all signals that cannot be seen. Outside on the line he will see that the permanent way is up to standard, that the angles of the crossings are not too flat, and that the point switches have the requisite fittings.

What the requirements are that the Inspecting Officer will expect will be seen from the following statement.

The requisite apparatus for providing by means of the block telegraph system an adequate interval of space between following trains, and in the case of junctions, between converging or crossing trains. In the case of single lines worked by one engine under steam (or two or more coupled together) carrying a staff, no such apparatus will be required.

Home signals and distant signals for each direction to be fixed at stations and junctions, with extra signals for such dock or bay lines as are used either for the arrival or for the departure of trains, and starting signals for each direction at all passenger stations which are also block posts. On passenger lines all cross-over roads and all connections for freight or mineral lines and sidings to be protected by home and distant signals, and as a rule at all important running junctions, a separate distant signal to be provided in connection with each home signal.

Signals may be dispensed with on single lines under the following conditions:

(a) At all stations and siding connections upon a line worked by one engine only (or two engines coupled together) carrying a staff, and when all points are locked by such staff.

(b) At any intermediate siding connection upon a line worked under the train staff and ticket system, or under the electric staff or tablet system, where the points are locked by the staff or tablet.

(c) At intermediate stations, which are not staff or tablet stations upon a line worked under the Electric Staff or Tablet System; sidings, if any, being locked as in (b).

The signals at junctions to be on separate posts or on brackets; the signals at stations when there is more than one arm on one side of a post to be made to apply—the first or upper arm to the line on the left, the second arm to the line next in order from the left and so on; but in cases where the main or more important line is not the one on the left, separate signal posts to be provided or the arms to be on brackets. Distant signals to be distinguished by notches cut out of the ends of the arms, and to be controlled by home or starting signals for the same direction, when on the same post. A distant signal arm must not be placed above a home or starting signal arm on the same post for trains going in the same direction.

In the case of sidings a low short arm and a small signal light distinguishable from the arms or lights for the passenger lines, may be employed, but in such cases disk signals are, as a rule, preferable.

Every signal arm to be so weighted as to fly to and remain at danger on the breaking at any point of the connection between the arm and the lever working it.

The front signal lights [both home and distant] to be green for all-right, and red for danger; the back lights (visible only when the signals are at danger) to be white.

Facing points to be avoided as far as possible, but when they cannot be dispensed with, they must be placed as near as practicable to the levers by which they are worked or bolted. The limit of distance from levers working points to be 200 yds. in the case of facing points, and 300 yds. in the case of trailing points on the main line, or safety points of sidings.

In order to ensure that the points are in their proper position before the signals are lowered, and to prevent the towerman from shifting them, while a train is passing over them, all facing points must be fitted with facing point locks and detector bars, and with means for detecting any failure in the connections between the signal tower and points. The length of the detector bars must exceed the greatest wheel base between any two pairs of wheels of the vehicles in use on the line, and the stock rails are to be tied to gage with iron or steel ties. All points, whether facing or trailing, to be worked or bolted by rods and not by wires, and to be fitted with double connecting rods.

The levers by which points and signals are worked to be interlocked, and as a rule brought close together into the position most convenient for the person working them, in a signal tower or on a properly constructed

stage. The signal tower to be commodious, and to be supplied with a clock, and with a separate block instrument for signaling trains on each track. The point levers and signal-levers to be so placed in the tower that the signalman when working them shall have the best possible view of the railroad and the tower itself to be so situated as to enable the towerman to see the arms, and the lights of the signals, and the working of the points. The back lights of the signal lamps to be made as small as possible, having regard to efficiency. If from any unavoidable cause, the arm and light of any signal cannot be seen by the towerman they must, as a rule, be repeated in the tower.

The interlocking to be so arranged that the towerman shall be unable to lower a signal for the approach of a train until after he has set the points in the proper position for it to pass, and that it shall not be possible for him to exhibit at the same moment any two signals that can lead to a collision between two trains; and that after having lowered the signals to allow a train to pass he shall not be able to move any points connected with or leading to the line on which the train is moving; also if possible points to be so interlocked as to avoid the risk of a collision.

Home or starting signals next in advance of trailing points, when lowered are to lock such points in either position, unless such locking will unduly interfere with the traffic.

A distant signal must not be capable of being lowered unless the home and starting signals in advance of it have been lowered. Sidings must be so arranged that switching operations upon them shall cause the least possible obstruction to the passenger lines. Safety points are to be provided on freight and mineral lines and sidings, at their junctions with passenger lines, with the points closed against the passenger lines, and interlocked with the signals.

When a junction is situated near to a passenger station the platforms are to be so arranged as to prevent, as far as possible, any necessity for having trains stand on the junction.

The junctions of all single lines to be, as a rule, formed as double-line junctions.

The lines of railroad leading to the passenger platforms to be arranged so that the engines shall always be in front of the passenger trains as they arrive at and depart from a station, and so that in the case of double lines or of passing places on single lines each line shall have its own platform. At terminal stations a double line of railroad must not end as a single line.

Platforms to be continuous and not less than 6 ft. wide for stations of small traffic nor less than 12 ft. wide for important stations; the descents at the ends of the platforms to be by ramps and not by steps. Pillars for the support of roofs and other fixed works to be not less than 6 ft. from the edges of the platforms. The height of the platforms above rail level to be 3 ft. save under exceptional circumstances, and in no case less than 2 ft. 6 in. The edges of the platforms to overhang not less than 12 in. As little space as possible to be left between the edges of the platforms and those of the footboards on the carriages. Shelter to be provided on every platform, and conveniences where necessary. Names of stations to be shown on boards and on the platform lamps.

When stations are placed on or near a viaduct or bridge under the railroad a parapet or fence on each side is to be provided of sufficient height to prevent passengers who may by mistake leave the cars when not at the platform from falling from the viaduct or bridge in the dark.

Foot-bridges or subways to be provided for passengers to cross the railroad at all exchange and other important stations. Staircases or ramps leading to or from platforms to be at no point narrower than at the top, and the available width to be in no case contracted by any erection or fixed obstruction whatever below the top.

At all stations where crowding may be expected the staircases or ramps to be of ample width, and barriers for regulating the entrance of the crowd at the top to be erected. If in such cases there are gates at the bottom, a speaking tube or other means of communication between the top and bottom is to be provided, and in all cases gates at the bottom of a staircase or ramp must open outwards. For closing the openings at the top sliding bars or gates are considered best.

The steps of staircases to be never less than 11 in. in the tread nor more than 7 in. in the rise, and midway landings to be provided where the height exceeds 10 ft.

Efficient handrails to be provided on both staircases and ramps. In subways where ramps are used, the inclination is not to exceed 1 in 8.

A clock is to be provided at every station, in some conspicuous position visible from the platforms.

No station is to be constructed or a siding joined to a passenger line on a steeper gradient than 1 in 260 except where it is unavoidable. When the line is double and the gradient at a station or siding-junction is necessarily steeper than 1 in 260, and when danger is to be apprehended from vehicles running back, a catch siding, with points weighted for the siding, or a throw-off switch, is to be provided to intercept runaway vehicles, at a distance outside the home signal for the ascending line greater than the length of the longest train running upon the line.

Under similar circumstances when the line is single, provision for averting danger from runaway vehicles is to be made—

(1) At a station in one of the following manners:

(a) A second line to be laid down, a second platform to be constructed, and a catch siding or throw-off switch to be provided on the ascending line inside the loop points.

(b) A loop line to be constructed lower down the incline than the station platform, with a similarly placed catch-siding or throw-off switch.

(2) At a siding junction in one of the following manners (except where it is possible to work the traffic with the engine at the lower end of a goods or mineral train, in which case an undertaking to do so given by the company will be accepted as sufficient):

(a) A similar loop to be constructed, as in the case of a station.

(b) Means to be provided for placing the whole train on a siding clear of the main line before any switching operations are commenced.

Engine turntables of sufficient diameter to enable the longest engines and tenders in use on the line to be turned without being uncoupled to be erected at terminal stations and at junctions and other places at which the engines require to be turned, except in cases of short lines not exceeding 15 miles in length, where the stations are not at a greater distance than three miles apart, and the railroad company gives an undertaking to stop all trains at all stations. Care to be taken to keep all turntables at safe distances from the adjacent lines of rails so that engines, wagons or cars when being turned may not foul other lines or endanger the traffic upon them.

Cast-iron must not be used for railroad under bridges except in the form of arch-ribbed girders where the material is in compression. In a cast-iron arched bridge the breaking weight of the girders to be not less than three times the permanent load due to the weight of the superstructure, added to six times the greatest moving load that can be brought upon it.

In a wrought-iron or steel bridge the greatest load that can be brought upon it added to the weight of the superstructure, not to produce a greater strain per square inch on any part of the material than five tons (2,240 lbs.) where wrought-iron is used, or 6½ tons where steel is used.

The engineer responsible for any steel structure is to forward to the Board of Trade a certificate to the effect that the steel employed is either cast-steel or steel made by some process of fusion subsequently rolled or hammered, and of a quality possessing considerable toughness, and ductility, together with a statement of all the tests to which it has been subjected.

In cases where bridges or viaducts are constructed wholly or partially of timber a sufficient factor of safety, depending on the nature and quality of the timber, is to be provided for.

It is desirable that viaducts should as far as possible be wholly constructed of brick or stone, and in such cases they must have parapet walls on each side not under 4 ft. 6 in. in height above the rail level, and not less than 18 in. thick.

Where it is not practicable to construct the viaducts of brick or stone, and iron or steel girders are made use of, it is considered best that in important viaducts the permanent way should be laid between the main girders. In all cases substantial parapets with a height of not less than 4 ft. 6 in. above rail level must be provided by an addition to the girders unless the girders themselves are sufficiently high. On important viaducts where the superstructure is of iron, steel or timber substantial outside wheel guards to be fixed above the level of and as close to the outer rails as possible, but not so as to be liable to be struck by any part of an engine or train running on the rails.

In the construction of the abutments or piers which support the girders of high bridges and viaducts, cast-iron columns of small size must not be used.

In all large structures a wind pressure of 56 lbs. per sq. ft. is to be assumed for the purpose of calculation, which will be based on the rules laid down in the report dated May 20, 1881, of the committee appointed by the Board of Trade after the Tay Bridge disaster, to consider the question of wind pressure on railroad structures.

The upper surfaces of the wooden platforms of bridges and viaducts are to be protected from fire.

All castings for use in railroad structures to be, where practicable, cast in a similar position to that which they are intended to occupy when fixed.

The joints of rails to be secured by means of fish plates or by some other equally secure fastening. On main lines and lines where heavy traffic may be worked at high speed the chairs must weigh not less than 40 lbs., but on branch lines or lines on which the traffic is light, chairs weighing 30 lbs. may be used.

When chairs are used to support the rails they must be secured to the ties at least partially by iron spikes or bolts. With flat-bottomed rails, when there are no chairs or with bridge rails, the fastenings at the joints and at some intermediate places to consist of fang or other through bolts, and such rails on curves with radii of 15 chains or less to be tied to gage by iron or steel ties at suitable intervals.

In any curve where the radius is 10 chains or less a check rail is to be provided.

Diamond crossings, as a rule, not to be flatter than 1 in 8.

No standing work (other than a passenger platform) to be nearer to the side of the widest car in use on the line than 2 ft. 4 in. at any point between the level of 2 ft. 6 in. above the rails and the level of the upper parts of the highest car doors. This applies to all arches, abutments, piers, supports, girders, tunnels, bridges, roofs, walls, posts, tanks, signals, fences, and other works, and to all projections at the side of a railroad constructed to any gage.

The intervals between adjacent tracks where there are two lines only, or between main track and sidings, is to be not less than 6 ft. Where additional running tracks are alongside the main lines, an interval of not less than 9 ft. 6 in. is to be provided, if possible, between such additional lines and the main lines.

At all grade crossings of public roads the gates are to be so constructed that they may be closed either across the railroad or across the road at each side of the crossing; and a lodge, or in the case of a station, a gatekeeper's box to be provided, unless the gates are worked from a signal tower. The gates must not be capable of being opened at the same time, for the road and the railroad, and must be so hung as not to admit of being opened outwards towards the road. Stops to be provided to keep the gates in position across the road or railroad. Wooden gates are considered preferable to iron gates and single gates on each side to double gates. Red disks or targets must be fixed on the gates, with lamps for night use; and semaphore signals in one or both directions interlocked with the gates may be required. At all grade crossings of public roads or footpaths a footbridge or a subway may be required.

At occupation and field crossings the gates must be hung so as to open outwards from the line.

Sidings connected with the main lines near a public road grade crossing to be so placed that switching may be carried on with as little interference as possible with the level crossing, and as a rule the points of the sidings to be not less than 100 yds. from the crossing.

At public road grade crossings in or near populous places the lower portions of the gates to be either close barred or covered with wire netting.

Mile posts, half mile and quarter mile posts, and gradient boards are to be provided along the line.

Tunnels and long viaducts in all cases must be constructed with refuges for the safety of trackmen. On under bridges without parapets hand rails are to be provided. Viaducts of steel, iron or timber must be provided with manholes or other facilities for inspection.

Continuous brakes (in accordance with the Regulation of Railways Act of 1889) complying with the following requirements to be provided on all trains carrying passengers, viz.:

(1) The brake must be instantaneous in action and capable of being applied by the engineer and conductor.

(2) The brake must be self-applying in the event of any failure in the continuity of its action.

(3) The brake must be capable of being applied to every vehicle of the train whether carrying passengers or not.

(4) The brake must be in regular use in daily working.

(5) The materials of the brake must be of a durable character and easily maintained and kept in order.

Any undertaking furnished by a railroad company to be under the seal and signed by the Chairman and Secretary of the company.

In addition there are the following requirements for working single lines:

In the case of a line being single an undertaking must be sent to the Board of Trade through the Inspecting Officer to the effect that one of the three following modes of working single lines will be adopted, namely:

1. By train staff and train tickets, combined with the absolute block telegraph system.

2. With only one engine in steam or two or more engines coupled together upon the single line or any section thereof at one and the same time. Such engine or engines to carry the staff belonging to the line or section on which the train is traveling. (No tickets to be allowed under this mode of working.)

3. By the electric tablet or electric staff system under which only one of the tablets (or staffs) applying to any section can be in use at the same time.

The approval of the Board of Trade to be obtained for the apparatus proposed to be used and for the rules of working.

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In addition to the requirements, the Board of Trade have made some recommendations which are as follows:

There should be a brake vehicle with a conductor in it at or near the tail of every passenger train. This vehicle should be provided with a raised roof and extended sides glazed to the front and back, and it should be the duty of the conductor to keep a constant lookout from it along his train.

All passenger cars should be provided with continuous footboards extending the whole length of each car, and as far as the outer ends of the buffer castings. As passenger cars pass from one company's lines to another it is essential for the public safety that although the widths of the cars on the different lines may differ from each other, the widths across the cars from the outside of the continuous footboard on the opposite side should be identical for the cars of all railroad companies so that the lines of rails may be laid at the proper distance from the edges of the passenger platforms.

There should be efficient means of communication between the conductor of every passenger train and the engineer, and between the passengers and the servants of the company in charge of the train.

The tires of all wheels should be so secured as to prevent them from flying open when they are fractured.

The engines employed with passenger trains should be of a steady description with not less than six wheels with the center of gravity in front of the driving wheels,

and with the motions balanced. They should as a rule be run chimney in front.

Records should be carefully kept of the work performed by the wearing parts of the rolling stock to afford practical information in regard to them, and to prevent them from being retained in use longer than is desirable.

In addition to the block telegraph instruments it is desirable that there should be speaking instruments or telephones for communication between towermen, and Looks for recording the running of the trains.

When drovers or other persons are permitted to travel with freight cattle trains, suitable vehicles should be provided for their accommodation.

Side tracks should be provided at all main line stations where slow trains are liable to be shunted for fast trains to pass them. If at such stations it is impossible to provide side tracks, and slow trains have to be shunted from one main line to the other to allow of fast trains passing them, some simple arrangements should be supplied in the signal towers to help to remind the towerman of the shunted train.

Efficient means should be adopted to prevent the accidental opening of the doors of passenger cars.

*(To Be Concluded.)*

## Tandem Compound Consolidation Locomotive for the Erie.

Our illustrations show one of the large tandem compound consolidation engines recently built by the American Locomotive Company at their Cooke Works, for the Erie. The hand rails at the front of engine and on the right side of running board are an unusual addition. The air drums are placed over the fire-box and the steam fountain in the engineman's cab draws its supply directly from the steam dome and thus insures drier steam for the injectors and other auxiliaries.

The engine weighs 209,000 lbs., with 185,500 lbs. on drivers, and can exert a starting pull of 45,900 lbs. The cylinders are 16 and 30 in. in diameter and have a piston stroke of 30 in. The total heating surface is 2,983 sq. ft. The diameter of drivers is 56 in. The above dimensions indicate that they have been designed for heavy freight service.

The principal dimensions are found in the following table:

| | |
|---|---|
| Simple or compound | Compound |
| Kind of fuel to be used | Fine anthracite |
| Weight on drivers | 185,500 lbs. |
| Weight on truck wheels | 23,500 lbs. |
| Weight, total | 209,000 lbs. |
| Weight, tender loaded | 120,000 lbs. |

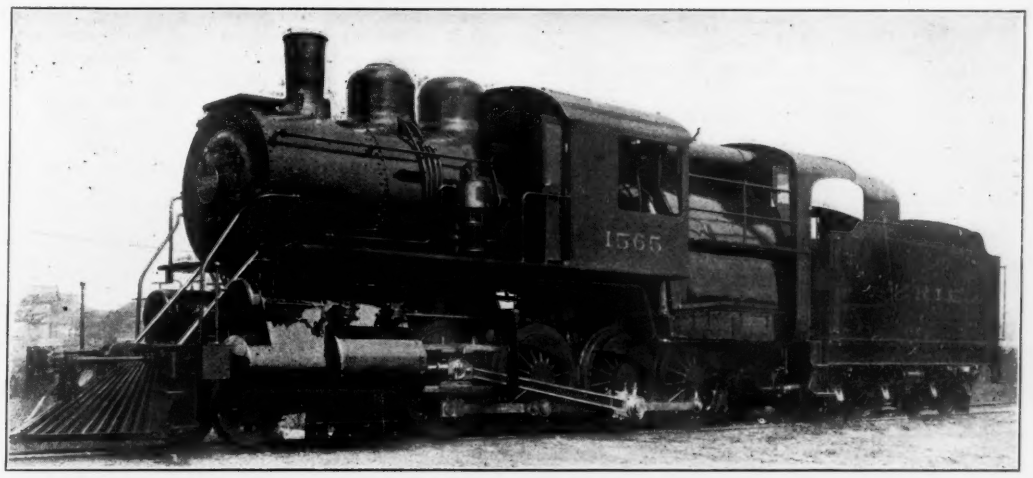



Fig. 1.—Tandem Compound Consolidation for the Erie.

| | |
|---|---|
| Fire-box, width | 8 ft. ¼ in. |
| Grate, kind of | Drop and rocker bar |
| *Tubes.* | |
| Tubes, number | 369 |
| Tubes, outside diameter | 2 in. |
| Tubes, length over sheets | 14 ft. 6 in. |
| *Other Parts.* | |
| Exhaust nozzle | Single, high |
| Netting, wire or plate | Wire |
| Netting, size of mesh or perforation | 2½ x 2½ in. |
| *Tender.* | |
| Tank capacity for water | 6,000 gal. |
| Coal capacity | 10 tons |
| Type of underframe, wood or iron | 12-in. channel |
| Type of truck | Barber |
| Diameter of truck wheels | 33 in. |
| Diameter and length of axle journals | 5 x 9 in. |

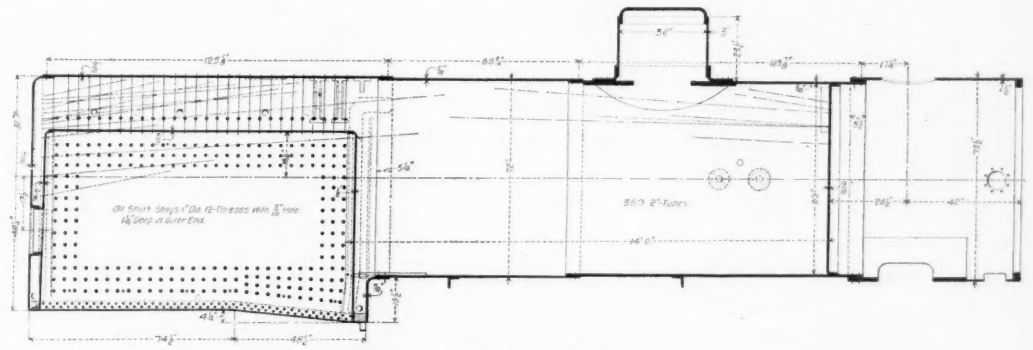
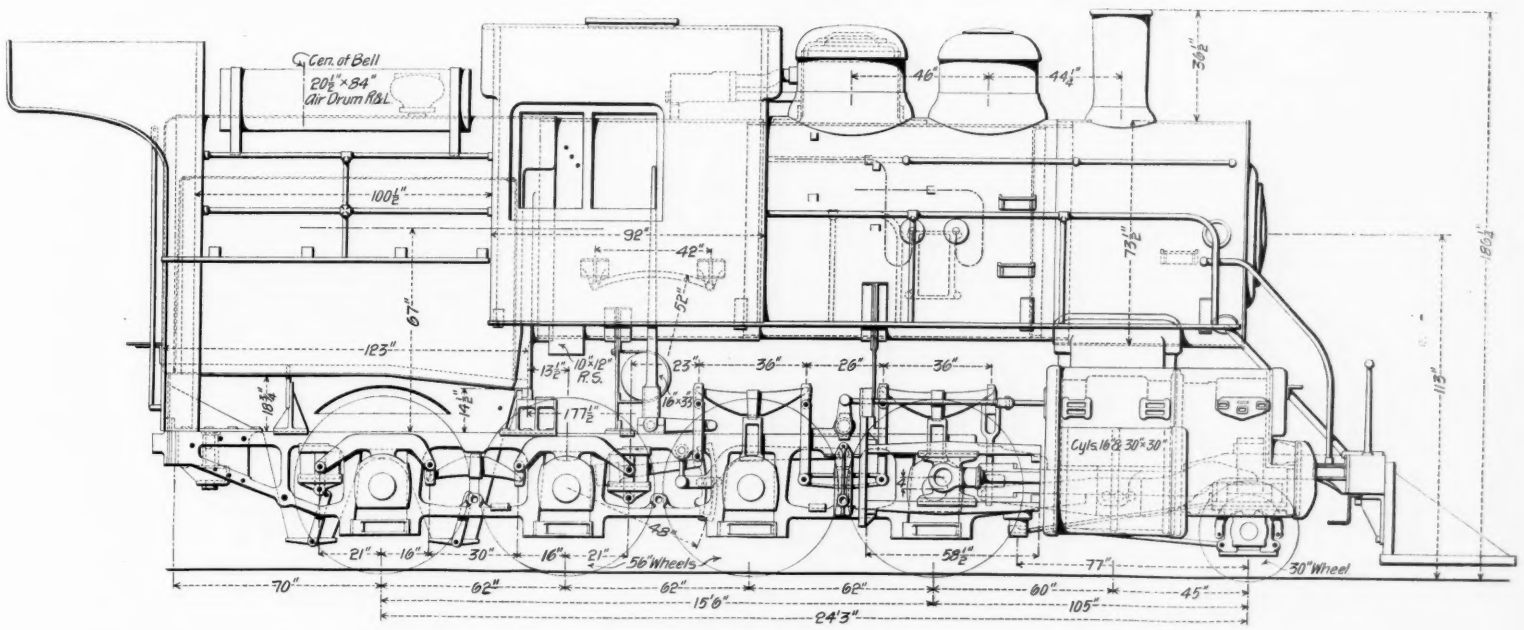



Fig. 3.—Boiler, Erie Compound.




Side Elevation, Erie Compound.

### *General Dimensions.*

| | |
|---|---|
| Wheel base of engine, total | 24 ft. 3 in. |
| Wheel base, driving | 15 ft. 6 in. |
| Wheel base, total (engine and tender) | 51 ft. 11 in. |
| Height, center of boiler above rails | 9 ft. 5 in. |
| Height of stack above rails | 15 ft. 6½ in. |
| Heating surface, fire-box | 199 sq. ft. |
| Heating surface, tubes | 2,784 sq. ft. |
| Heating surface, total | 2,983 sq. ft. |
| Grate area | 76.3 sq. ft. |

### *Wheels and Journals.*

| | |
|---|---|
| Drivers, number | 8 |
| Drivers, diameter | 56 in. |
| Drivers, material of centers | Cast steel and cast iron |
| Truck wheels, diameter | 30 in. |
| Journals, driving axle, size | 10 and 9 x 12 in. |
| Journals, truck axle, size | 6 x 10 in. |

### *Cylinders.*

| | |
|---|---|
| Cylinders, diameter | 16 and 30 in. |
| Piston, stroke | 30 in. |
| High pressure steam ports | 1⅞ x 30½ in. |
| Low pressure steam ports | 2⅛ x 28½ in. |

### *Valves.*

| | |
|---|---|
| Valves, kind of | Piston |

### *Boiler.*

| | |
|---|---|
| Boiler, type of | Straight top |
| Boiler, working steam pressure | 220 lbs. |
| Boiler, thickness of material in barrel | 9/16 and ¾ in. |
| Outside diameter of barrel, first course | 70½ in. |
| Seams, kind of horizontal | Sextuple |
| Crown sheet stayed with | Radial stays |

### *Fire-box.*

| | |
|---|---|
| Fire-box, length | 9 ft. 6⅛ in. |

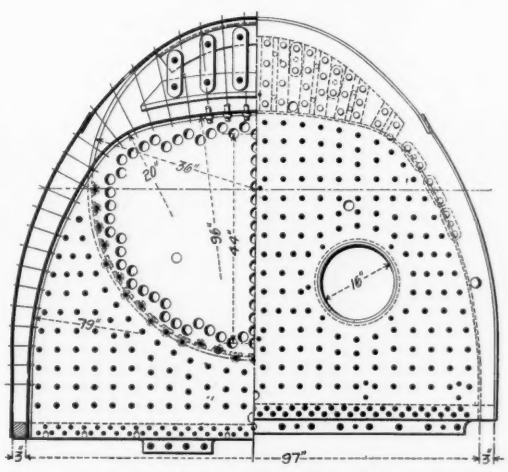



Fig. 4.—Half Section and End Elevation of Fire-box, Erie Compound.

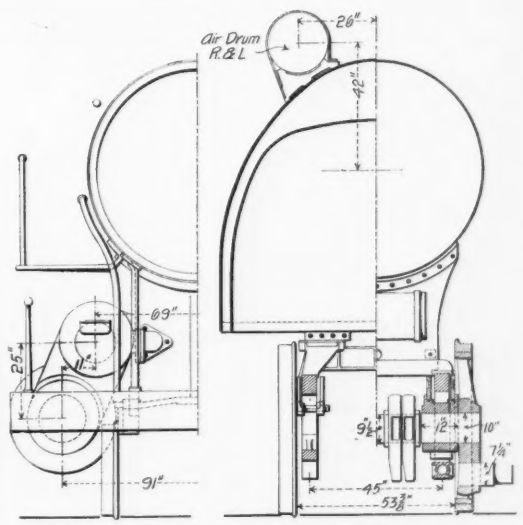



Fig. 5.—Front Elevation and Section Through Drivers, Erie Compound.

## High Speed Electric Interurban Roads.*

The electric railroad is to perform a service for mankind as notable and perhaps ultimately as great as that rendered by its steam-operated precursor. Already it handles the bulk of suburban and short-distance interurban passenger traffic; it carries freight, mail, express, and baggage. In 1899, 10 miles of electric road were built for every mile of steam road constructed.

The greatest development of interurban roads has taken place in the great agricultural districts of the middle western States, where they have grown to a truly surprising extent. It is often said that electric railroads have checked the concentration of population in great cities by creating suburban districts, but in the farming regions they have had a still greater effect in building up many small centers of population. The Union Traction Co. of Indiana operates 109 miles of interurban track and 54 miles of city track in the gas belt of that State, and serves a population of 350,000. It connects the cities of Anderson, Marion, Muncie, Indianapolis and about 20 smaller towns, and traverses six of the most prosperous counties of the State. The interurban lines are located almost entirely on private right of way protected by fences and cattle guards. Tests have shown that a maximum speed of 58 miles an hour may be reached and an average speed of 45 miles an hour maintained. The rates of fare are approximately one cent a mile. The daily receipts of the interurban lines are said to be $3,000 on an average, but this is frequently increased to $8,000 and on one occasion was $11,000 in a single day. Large additions are contemplated, about doubling the present mileage.

One of the greatest possibilities of the interurban road lies in the development of freight traffic. It is well fitted for the transfer of farm produce and supplies for farmers and for carrying package merchandise, and it can often give great convenience of delivery and the possibility of handling freight economically, especially in small cities. The Chicago, Harvard & Lake Geneva has not only a large freight traffic of its own but carries on an interchange of business with steam roads, to a greater extent perhaps than any other electric road in the United States. Its southern terminus is at Harvard, on the Chicago & North Western, and at Walworth, 8½ miles north of this place, the road crosses the Chicago, Milwaukee & St. Paul, thence running two miles northeast to Lake Geneva, one of Wisconsin's most popular summer resorts. One-third of the business of the road is in handling freight. Freight cars from the railroads are hauled to sidings on the electric road at a flat rate of $5 per car, and piece freight is transported on a one-rate plan between any two points on the road for 5 cents per 100 lbs., no package being handled for less than 10 cents. A freight motor car with a crew of two men carries package freight and hauls from one to four steam-road freight cars. There are six freight sidings along the road, not including the company's yards. Live-stock shipments are an important part of the business. In summer refrigerator cars are run twice a week over the Chicago & North Western for the benefit of creameries situated on the electric road, and last winter 3,000 tons of ice were hauled from Lake Geneva for local use along the line. Passenger tickets are sold by the electric road to points on the steam roads and baggage is carried free.

While many electric roads have been constructed cheaply and of light materials, the tendency is more and more towards a substantial type of construction similar to the best steam-railroad practice. The Grand Rapids, Grand Haven & Muskegon, recently completed, is equipped with standard 70-lb. T-rails laid on a private right of way. The road runs from Grand Rapids to Muskegon, Mich., a distance of 35 miles, with a branch seven miles long to Grand Haven. It parallels steam roads to both cities, the running time of the electric and steam cars being about the same. Another interesting road running out from Grand Rapids is the Grand Rapids, Holland & Lake Michigan Rapid line, extending from Grand Rapids to Holland and there connecting with two short lines to the lake shore. This road traverses a rich farming country, thickly settled by Dutch and Germans, and the two lines to the lake shore reach a favorite summer resort district. The aggregate length of track of the combined roads is 71 miles, the total distance covered being 45 miles, 19 miles of this comprising the two roads running from Holland to the lake. Cars are operated on a headway of one hour and require at the present time 90 minutes for the trip from Grand Rapids to Holland. This time is to be reduced as soon as the roadbed is improved and a maximum speed of 45 miles will be realized, with an average speed of 26 miles per hour, including stops. All railroads are crossed by bridges and subways, and the private right of way, which is four rods wide, is fenced in. The freight rates are low, ranging from 3½ to 23 cents per 100 lbs., depending upon a distance-rate basis and classification. The express rates vary from 20 cents for a package weighing not more than 10 lbs. to 45 cents for packages weighing from 50 to 100 lbs., above which the rate is 45 cents per hundred. The franchise calls for rates not exceeding 1½ cents per mile for carrying passengers, but as the steam road paralleling the electric line has greatly reduced its fares since the building of the latter, the electric road has made special rates during certain hours of the day when the steam-road trains are in operation between the terminal points.

*Extracts from an article by George H. Gibson in the September number of the *Engineering Magazine*.

While electric roads are approaching steam lines in type of construction and methods of operation, many of the latter are finding it advantageous to adopt electric traction, especially for short-haul and suburban service. The Quebec, Montmorency & Charlevoix has in this way within two years increased its total yearly capacity and receipts from $44,221 to $73,292.

Another road which has greatly improved its service by adopting electric traction is the Buffalo & Lockport. The company operating this road was organized in April, 1898, and leased for 99 years the Lockport branch of the Erie, running from Lockport to North Tonawanda, N. Y., and comprising 13½ miles of single track. It has since bought five and one-half miles of road in the streets of Lockport, seven and one-half miles of single track between Buffalo and North Tonawanda, and a mile of track in Buffalo, making the total length of the line at present 29 miles and giving through service from Buffalo to Lockport and Niagara Falls. Both passenger and freight traffic are handled, trolley cars being used for the passenger service and two electric locomotives for the freight service. These locomotives weigh 36 tons each. Since the road is a feeder of the Erie Railway system, the freight traffic is considerable and the locomotives are each equipped with four 160-h.-p. motors, designed to give a drawbar pull of 3,400 lbs. when running at 15 miles per hour, which is considered sufficient to handle a 340-ton train.

Perhaps the field of greatest activity in the United States for the construction of high-speed interurban lines has been in northern Ohio and southern Michigan, where there is now a network of highly equipped roads upon which through traffic is being established, offering even such accommodations as parlor and sleeping cars. It is said that a service of this character will shortly be established between Columbus and Cincinnati. The roads utilized will be the Southern Traction Company's lines from Cincinnati to Dayton; the Dayton-Springfield & Urbana to Springfield; and the Columbus, London & Springfield to Columbus, the service to be established as soon as the latter road is completed. The schedule time between Columbus and Cincinnati will be about six hours. It is also proposed to operate through cars between Cleveland and Cincinnati, the route from Cleveland being over the Cleveland, Elyria & Western, the Cleveland, Ashland & Mansfield, the Mansfield, Galion & Crestline, and the Columbus, Delaware & Marion, roads all either in operation or building.

Cleveland is the center of an extensive interurban electric railroad system, extending in one direction nearly to Buffalo, N. Y., and in the other to Toledo, Ohio, which is also the terminus of a large number of roads. One of the roads connecting Cleveland and Toledo is the Toledo, Fremont & Norfolk, about 60 miles long and controlled by the Lake Shore Electric Co. The roadbed, partly upon private right of way and partly upon public turnpike, is constructed for speeds exceeding 40 miles an hour. In preparing for a through service between Cleveland and Toledo, a series of experiments are being made by the Lake Shore Electric Company with a view of determining the most desirable motors for the traffic. A cross-country schedule of 35 to 40 miles an hour has been established and a speed of over 60 miles an hour has been maintained for short distances. Some of the cars are fitted with four 100-h.-p. electric motors. The cars now in service on the Toledo, Fremont & Norwalk are equipped with 75-h.-p. Westinghouse motors. That part of the Lake Shore Electric line between Cleveland and Norwalk is entirely on private right of way and is rock-ballasted and laid with 75-lb. T-rails. This company is making an especial effort to develop freight traffic in fruit and dairy products. Passenger mileage books are sold for $12.50 per 1,000 miles, and local fares are about one-half of those charged by steam roads.

Toledo and Detroit are connected by a series of electric roads, one of the most completely equipped of which is the Toledo & Monroe, having 18 miles of single track laid with 70-lb. T-rails and ballasted with broken limestone. The equipment consists of ordinary passenger cars, chair cars, combined passenger and baggage cars, and freight cars. The passenger cars are 40 ft. long and a regular schedule speed of 30 miles an hour, including stops, is maintained.

One of the oldest high-speed roads in America is the Detroit, Ypsilanti & Ann Arbor. As originally constructed this road had a length of 50 miles, 40 miles between Detroit and Ann Arbor with a branch line of 10 miles to Saline. The line has recently been considerably extended, now reaching to Jackson, Mich., where it connects with other interurban roads. The most remarkable effect of this road has been the development of an enormous passenger traffic. During the first year 4,000 passengers were carried a day, against 200 previously carried a day by the steam road passing through the same towns. The fare for 40 miles is 50 cents, while the fare charged by the steam roads for the same distance is $1.12. A 1,000-mile mileage book is sold for one cent per mile. The average fare per passenger is 15.9 cents. Many houses are being built in the small towns along the route and market gardening is rapidly developing in the country traversed. Freight service is given twice a day and express packages are carried in the baggage compartments of the passenger cars. When the line was first opened, more freight was offered than could be carried, although the rates were two-thirds more than those asked by the steam-railroad company.

Extending north from Detroit 73 miles to Port Huron, Mich., and comprising in all 110 miles of single track exclusive of sidings, are the lines of the Rapid Railway Company, another pioneer in the electric interurban field. About the same fares are charged as upon the Detroit, Ypsilanti & Ann Arbor road, and arrangements have been made for an extensive freight traffic in fruit, fish, vegetables, groceries and general merchandise. It is said that 50 per cent. of the lighter trade going to Detroit is now carried by the electric line. The cars are run on train despatchers' orders, telephone stations being placed at all sidings. After leaving the city limits of Detroit there are no grade crossings and the track is thoroughly well-laid and ballasted. Hourly service is given regularly over the whole line and cars are operated at shorter intervals between points where traffic is dense. The schedule time for the cars is 27 miles per hour, including stops, and between stations the speed reaches 45 miles per hour.

In the State of Michigan there are 24 interurban lines actually in operation and franchises have been asked for 47 more. At Hudson, N. Y., begins a long electric system which extends a distance of 105 miles to Warrensburg, near Lake George, running for a great part of the way along the Hudson and through a semi-mountainous country and giving a view of the Catskills and the Berkshire Hills.

The Aurora, Elgin & Chicago Railway has been designed for a continuous maximum speed of 70 miles an hour and the track is of such substantial character and easy alignment that higher speeds can be attained. The service rails are to weigh 80 lbs. to the yard, the track is to be stone-ballasted, and all bridges will be of concrete and steel construction. The third rail is to weigh 100 lbs. to the yard and is to be supplied with direct current from sub-stations, to which power will be transmitted at 26,000 volts by three-phase alternating current over aluminum feeders. The schedule speed will be 40 miles an hour, including stops at stations three miles apart. Cars are to weigh 40 tons and are to run at a maximum speed of 65 miles per hour with a possible 70 miles per hour on a level track and with normal voltage on the third rail. The cars are to be operated either singly or in trains, and are to be equipped by the General Electric Company.

## Railroad Statistics to June 30, 1901.

The Interstate Commerce Commission has issued an abstract of the statistician's report of the operations of the railroads of the country for the fiscal year that ended June 30, 1901. The preliminary income report for the 12 months here reported was issued last December and appeared in the *Railroad Gazette* of December 27, page 893. The principal items in the abstract now issued are given in the table below, in which we include the figures for the preceding two years, taken from the similar statement published in the *Railroad Gazette* of July 19, 1901, in which were also given the total for 1898.

*Railroad Statistics for Year Ending June 30.*

| | 1901. | 1900. | 1899. |
|---|---|---|---|
| Miles of railroad completed | 197,237 | 193,346 | 189,295 |
| Increase in 12 months | 3,892 | 4,051 | 2,899 |
| Miles of road operated | 195,571 | 192,556 | 187,535 |
| Number of corporations | 2,057 | 2,023 | 2,049 |
| Number in hands of receivers | 45 | 52 | 71 |
| Mileage in hands of receivers | 2,497 | 4,178 | 9,853 |
| Locomotives | 39,584 | 37,663 | 36,703 |
| Cars owned, passenger | 35,969 | 34,713 | 33,850 |
| Cars owned, freight | 1,464,328 | 1,365,531 | 1,295,510 |
| Cars owned, total | 1,550,833 | 1,450,838 | 1,375,916 |
| Cars and eng. with pow. br'ks | 1,164,048 | 1,005,729 | 808,074 |
| Do. with automatic couplers | 1,549,840 | 1,404,132 | 1,137,719 |
| Employees | 1,071,169 | 1,017,653 | 928,924 |
| Employees per 100 miles road | 548 | 529 | 495 |
| Capital stock, com., millions | $4,475.4 | $4,522.3 | $4,323.3 |
| Capital stock, pref., millions | 1,331.2 | 1,323.3 | 1,191.7 |
| Capital stock, total, millions | 5,806.6 | 5,845.6 | 5,515.0 |
| Funded debt, millions | 5,881.6 | 5,645.5 | 5,518.9 |
| Current liabilities, millions | 620.4 | 594.8 | 554.3 |
| Total stock and funded debt, millions | 11,688.2 | 11,491.0 | 11,033.9 |
| Total stock and funded debt per mile of road | 61,528.0 | 59,676.0 | 60,556.0 |
| Dividends paid, millions | 156.7 | 139.6 | 111.0 |
| P. c. stock rec'v'g no div'd'nd | 48.7 | 54.3 | 59.4 |
| P. c. mtg. bonds rec'v'g no int. | 3.3 | 5.4 | 7.9 |
| Av. div'd on div'd-pay'g stock | 5.2 | 5.2 | 5.0 |
| Gross earnings, year, passenger, millions | $351.4 | $323.7 | $291.1 |
| Gross earnings, year, freight, millions | 1,118.5 | 1,049.3 | 913.7 |
| Gross earnings, year, total, inc. misc., millions | 1,588.5 | 1,487.0 | 1,313.6 |
| Average of same per mile | 8,123.0 | 7,722.0 | 7,005.0 |
| Operating expenses, millions | 1,030.4 | 961.4 | 857.0 |
| Net earnings, millions | 558.1 | 525.6 | 456.6 |
| Other income, millions | 179.7 | 162.9 | 148.7 |
| Net income, millions | 737.9 | 688.5 | 605.3 |
| Fixed charges, etc., millions | 496.4 | 461.2 | 441.2 |
| Net avail. for div., millions | 241.5 | 227.3 | 164.1 |
| Dividends paid, millions | 156.7 | 139.6 | 111.1 |
| Passengers carried, millions | 607.3 | 576.9 | 523.2 |
| Passengers 1 mile, millions | 17,353.6 | 16,039.0 | 14,591.3 |
| Freight carried, million tons | 1,089.2 | 1,101.7 | 959.7 |
| Same, one mile | 147,077.1 | 141,599.2 | 123,667.3 |
| Av. rate per ton-mile (mills) | 7.5 | 7.3 | 7.2 |
| Av. pass. fare per mile (cts.) | 2.0 | 2.0 | 1.92 |
| Employees killed | 2,675 | 2,550 | 2,210 |
| Employees injured | 41,142 | 39,643 | 34,993 |
| Passengers killed | 282 | 249 | 239 |
| Passengers injured | 4,988 | 4,128 | 3,442 |
| Other persons killed | 5,498 | 5,066 | 4,674 |
| Other persons injured | 7,209 | 6,549 | 6,275 |
| Total killed | 8,455 | 7,865 | 7,123 |
| Total injured | 53,339 | 50,320 | 44,629 |

The report shows the density of equipment; 202 locomotives and 7,926 cars are used per 1,000 miles of line. 59,631 passengers were carried and 1,704,005 passenger miles accomplished per passenger locomotive, and 47,692 tons of freight were carried and 6,439,736 ton miles accomplished per freight locomotive. There were substantial increases in density of traffic per mile of line, both in passenger and in freight.

The report contains a summary of freight traffic analyzed on the basis of commodity classification, and also

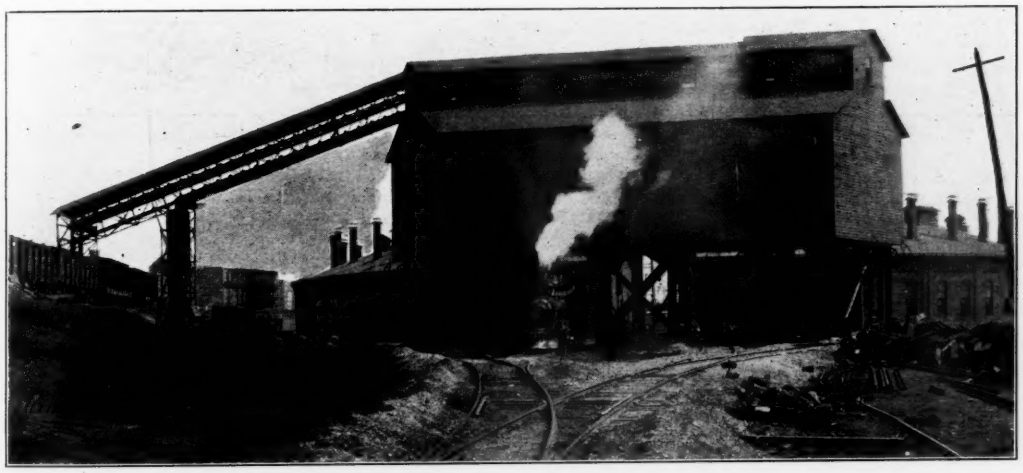
a summary indicating in some degree the localization of the origin of railroad freight by groups of commodities. The average revenue per passenger per mile for the year ending June 30, 1901, was 2.013 cents. For the preceding year it was 2.003 cents. An increase in earnings per train mile appears for both passenger and freight trains, and the average cost of running a train one mile also increased. The percentage of operating expenses to earnings was 64.86 per cent. The amount paid in salaries and wages to employees during the year was $610,713,701, equivalent to 59.27 per cent. of the operating expenses, and 38.44 per cent. of gross earnings.

In "deductions from income" (fixed charges) are embraced the following items: Interest accrued on funded debt, $262,094,838; interest on current liabilities, $5,526,572; rents paid for lease of road, $112,644,822; taxes, $50,944,372; permanent improvements charged to income account, $31,939,761; other deductions, $32,681,234. In the statistical report for the year 1900 was inserted a new summary of taxes paid showing the taxes in gross and per mile of line assigned to each State and Territory. In the present report this summary has been continued with considerable enlargement, due to a classification of taxes according to the basis used for computing the amount assessed.

In the chapter on accidents it appears that the casualties to employees resulting from coupling and uncoupling cars were, killed, 198, injured, 2,768. The corresponding figures for the year 1900 were, killed, 282; injured, 5,229. The number of passengers killed in collisions and derailments was 110; and 2,208 injured. The summaries giving the ratio of casualties show that one out of every 400 employees was killed and one out of every 26 was injured. Of trainmen one was killed for every 136 employed and one was injured for every 13 employed; and 61,537,548 passenger miles were accomplished for each passenger killed and 3,479,067 passenger miles for each passenger injured.

## Coaling Station for the Delaware, Lackawanna & Western Railroad at Hoboken, N. J.

The accompanying cut illustrates the locomotive coaling station of the Delaware, Lackawanna & Western Railroad at Hoboken, N. J. The station has a capacity



Coaling Station for the D. L. & W. at Hoboken, N. J.

of 1,300 tons of coal stored overhead. Four engines can take coal simultaneously, there being two tracks underneath the pocket, and one at each end. Coal is transferred from the car to the pocket by means of a gravity discharge elevator-conveyor, having a capacity of 80 tons an hour. The coal in passing from track hopper to elevator-conveyor is fed uniformly by a device which insures the proper supply of coal for each bucket, and renders flooding of machinery with coal impossible. Power is supplied by a 25 h.-p. electric motor, situated at the head of the elevator-conveyor, in the lantern of pocket.

This station, which was finished in February, 1902, was designed, equipped and erected by the Link-Belt Engineering Company.

## Hydraulic-Electric Analogies.

We recently gave an abstract of a paper read by Prof. H. T. Eddy at the recent Pittsburgh meeting of the Association for the Advancement of Science, in which alternating-current phenomena were illustrated by hydraulic principles. At the same meeting Prof. Mansfield Merriman read a paper on the advantages of siamesed hose lines for fire steamers, in which the analogies of direct-current phenomena with the steady flow of water were pointed out in more detail than usual, and a brief abstract of this paper will now be given.

Siamesed hose lines are now widely used when large fires require a large quantity of water to be delivered from a nozzle at high pressure. From the pump several long parallel lines of hose run to a so-called siamese joint, from which a shorter single hose runs to the nozzle. If $R$ be the resistance of each of the long lines and $r$ the resistance of the short single line, $H$ the head lost in friction in all these lines, and $q$ the discharge of water per second, it was shown that

$$H = \left(\frac{R}{n^2} + r\right) q^2$$

in which $n$ is the number of hose lines from the pump to the siamese joint. The resistance between the pump and the joint hence rapidly decreases with the number of hose lines. In practice four lines are generally used and hence the head lost in these lines is only one-sixteenth of that lost in a single hose.

An analogous equation for electric flow exists when several parallel wires run from a battery or direct-current dynamo and are brought together at a point from which a single wire carries the current onward. Here let $H$ be the voltage wasted in heat in all the wires, $R$ the resistance of each of the $n$ parallel wires, $r$ the resistance of the single wire, and $q$ the current; then,

$$H = \left(\frac{R}{n} + r\right) q$$

which differs from the hydraulic formula in having $n$ and $q$ raised to the first power instead of the second. The resistance between the battery and the joint decreases with the number of parallel wires, but less rapidly than in the case of water, and the voltage lost increases much less rapidly with increase in current.

The resistances $R$ and $r$ have different but analogous meanings in the above expressions. Let $L$ be the length and $D$ the diameter of each of the parallel lines of hose or wire, and $l$ and $d$ the same things for the single hose or wire. Then, for the flow of water,

$$R = f\ L/D^5 \text{ and } r = f\ l/d^5,$$

in which $f$ is a factor depending on the roughness of the pipe. For electric flow, however,

$$R = k\ L/D^2 \text{ and } r = k\ l/d^2,$$

in which $k$ is a factor depending on the specific resistance of the conductor. In both cases the resistance is directly as the length, but it is inversely as the fifth power of the diameter for water flow, and inversely as the square of the diameter for electric flow.

Analogies between hydraulic and electric flow are interesting and important, and they exist because both are methods of transferring energy. But they differ in details because these methods are different in respect to matter and motion, as the formulas derived from experience indicate. Furthermore, as we previously pointed out, the mistake should not be made of closely comparing the causes and effects. Voltage, or electromotive force, is analogous to pressure but not the same, and current is analogous to water flow but yet different. What voltage and current really are still remains unknown, and probably their true nature will continue to be unknown until the properties of the mysterious ether shall be clearly understood.

## Train Accidents in the United States in July.[1]

*bc, 1st, Southern Railway, Macon, Ga., butting collision of switching engines, badly damaging the engines and several cars. The wreck took fire and the cars were somewhat damaged by the flames. One fireman was fatally scalded and three other trainmen were injured.

eq, 2nd, Boston & Maine, Hoosick, N. Y., eastbound passenger train No. 834 was derailed, and the tender fell off a trestle bridge. Three trainmen and four passengers were injured. It is believed that the derailment was due to a broken axle.

bc, 2nd, Atlantic Coast Line, Monteith, Ga., passenger train No. 6, second section, collided with a freight train of the Southern Railway, injuring two passengers and four trainmen.

†rc, 3rd, Pittsburgh & Western, Glenshaw, Pa., an express train ran into the rear of a preceding local passenger train, standing at the station, making a bad wreck; one passenger was killed and 20 were injured. It is said that the collision was due to a misunderstanding between the train despatcher and a telegraph operator.

unf, 3rd, Montana Central, Portage, Mont., a freight train was derailed at a washout and two trainmen were killed.

unf, 3rd, Charlestown & Western Carolina, Port Royal, S. C., a passenger train was derailed by a tree which had been blown down and had fallen across the track, and the engine was overturned. The engineman was badly injured.

unf, 3rd, Michigan Central, Thomas, Mich., a freight train was derailed at a washout and two engines and 15 cars were ditched. The engineman and a tramp were killed and three trainmen were injured.

*rc, 4th, 1 a.m., Chicago & North Western, Round Grove, Ill., a freight train ran into the rear of a preceding train, wrecking the caboose and several cars. The conductor of the foremost train, who was in the caboose, was killed. The wreck took fire and was mostly burnt up.

xc, 4th, Pere Marquette, Williamsburg, Mich., a passenger train collided with an empty engine, and both the engines were badly damaged. The engineman of the empty engine was killed. This engine, having been deserted by the fireman, ran, after the collision, about three miles unattended.

dn, 4th, 10 p.m., Cleveland, Cincinnati, Chicago & St. Paul, Cleves, Ohio, the engine and seven cars of a freight train were derailed by a derailing switch at the end of the double track.

unx, 4th, New York Central & Hudson River, Albany, N. Y., one truck of a sleeping car in a westbound passenger train was derailed at a frog, and this car, with one other, ran off the track and came near falling down a bank. The engineman at the head of the train applied the brakes promptly, but there was another engine pushing at the rear and on this the steam was not promptly shut off.

†bc, 4th, Cincinnati, Richmond & Muncie, Richmond, Ind., butting collision between a passenger train and a freight; one passenger was killed and several other persons were injured.

unx, 4th, Central of New Jersey, Elizabeth, N. J., a passenger train was derailed and the engine and two cars were overturned. Ten passengers were injured.

xc, 6th, 1 a.m., Richmond, Fredericksburg & Potomac, Acca, Va., a freight train collided with some cars standing on the main track, and the engine and six cars were overturned. The fireman was killed and the engineman fatally injured.

bc, 8th, Mobile & Ohio, Selmer, Tenn., butting collision between a freight train and an empty engine, wrecking both engines and several cars. It is said that the empty engine was running in violation of a telegraphic order.

xc, 9th, Pennsylvania Road, Willow Grove, Pa., collision between a passenger train and a freight, wrecking several cars. One engineman and six passengers were injured, the engineman fatally.

unf, 9th, 3 a.m., Lake Erie & Western, Farmdale, Ill., a freight train broke through a bridge that had been weakened by a flood and one car fell into Farm Creek. The fireman was killed and the engineman was fatally injured.

dn, 11th, 3 a.m., New York Central & Hudson River, Herkimer, N. Y., several cars in an eastbound freight train were derailed by too quick application of the air-brakes and several cars were wrecked. A part of the wreck fell across one of the westbound tracks and a passenger train ran into it at high speed, derailing the passenger engine and badly damaging two passenger cars. The passenger engineman was injured.

rc, 11th, Atlantic Coast Line, Barnwell, S. C., rear collision of freight trains, wrecking several cars. The engine fell down a bank. One trainman was killed and another injured.

bc, 11th, Northern Pacific, Tuscor, Mont., butting collision of freight trains, making a bad wreck.

unx, 11th, Chicago & North Western, Malone, Wis., a work train was derailed and four cars were wrecked. Four trainmen were injured.

*unx, 11th, Southern Railway, Huntingburg, Ind., a freight train was derailed and several cars were wrecked. The wreck took fire and was mostly burnt up. The fireman was killed and four trainmen were injured.

bc, 12th, West Virginia & Northern, Howesville, W. Va., butting collision between an empty engine and a work train; one employee killed.

bc, 12th, Toledo, Peoria & Western, Washington, Ill., butting collision between a train consisting of an engine and a caboose, and a work train, wrecking both engines, the caboose and several cars. Two employees were killed and a passenger riding on the caboose and 12 employees were injured.

bc, 12th, 11 p.m., Louisville & Nashville, Bowling Green, Ky., butting collision of freight trains, wrecking both engines and 22 cars. A brakeman was killed and several trainmen were injured.

xc, 12th, Vandalia Line, Moran, Ind., a local freight train was run into by a through freight, and 19 cars and the station building were wrecked. Two passengers and one trainman were injured.

xc, 12th, Chicago & North Western, Ankeney, Iowa, collision between a passenger train and a freight, wrecking both engines. Fifteen passengers were injured.

rc, 14th, Missouri, Kansas & Texas, Atoka, Ind. T., a northbound passenger train ran into the rear of a preceding freight train, wrecking the caboose and six cars. Two trainmen and several passengers were injured.

xc, 14th, 10 p.m., Cleveland, Cincinnati, Chicago & St. Louis, West Carrollton, Ohio, a freight train descending a grade broke in two and the rear portion afterwards ran into the forward one, making a bad wreck. Two tramps were killed.

rc, 14th, 11 p.m., Baltimore & Ohio, Kirkersville, Ohio, a freight train ran into the rear of a preceding freight, wrecking the engine, caboose and two freight cars. One engineman and one brakeman were killed and another trainman was injured. It is said that the flagman who should have protected the rear of the foremost train went into the caboose and fell asleep.

rc, 15th, 4 a.m., Louisville & Nashville, Buckners, Ky., a passenger train ran into the rear of a preceding freight, wrecking two freight cars. The engineman was injured.

xc, 15th, 2 a.m., Seaboard Air Line, Raleigh, N. C., a passenger train ran into a freight car which had been left standing on the main track, and the engine was badly damaged. The engineman was killed. It is said that the freight car had escaped control in a yard near by.

xc, 15th, New York & Long Branch, Branchport, N. J., collision between a passenger train and a gravel train, due to a misplaced switch. The passenger engine fell down a bank into the Shrewsbury River, and the engineman and fireman were injured. The engineman of the gravel train was fatally injured, and several passengers slightly.

[1]Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The tabular record of totals is no longer kept, as a more complete report of the total number of accidents is published by the Interstate Commerce Commission. The classification of the accidents is indicated by the use of the following

ABBREVIATIONS.

| | |
|---|---|
| rc | Rear collisions. |
| bc | Butting collisions. |
| xc | Miscellaneous collisions. |
| dr | Derailments; defect of roadway. |
| eq | Derailments; defect of equipment. |
| dn | Derailments; negligence in operating. |
| unf | Derailments; unforseen obstruction. |
| unx | Derailments; unexplained. |
| o | Miscellaneous accidents. |

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

rc, 16th, Pennsylvania Lines, Cook's Ferry, Pa., passenger train No. 336 ran into the rear of a preceding freight, wrecking the engine, baggage car, caboose and four freight cars. Six passengers and five employees were injured.

bc, 16th, New York Central & Hudson River, Fulton Chain, N. Y., butting collision of freight trains; two brakemen injured, one of them fatally.

unx, 17th, Texas & Pacific, Mineola, Texas, an eastbound passenger train was derailed near the bridge over the Sabine river, and the baggage car, mail car and two passenger cars fell through the bridge. The baggageman was killed, two passengers were seriously and 12 slightly injured.

o, 17th, 9 p.m., Toledo, St. Louis & Kansas City, Continental, Ohio, the locomotive of a freight train was wrecked by the explosion of its boiler, and the engineman and fireman were killed. A woman sitting on the porch of a house near by was injured.

*bc, 18th, Minneapolis, St. Paul & Sault Ste. Marie, Pembine, Wis., butting collision of freight trains, wrecking both engines and many cars. The wreck took fire and 14 cars were burnt up. Both enginemen and one fireman were killed, and one brakeman was injured. The westbound train disregarded a meeting order.

bc, 18th, Delaware & Hudson, Binghamton, N. Y., butting collision of freight trains, damaging both engines. One fireman was fatally injured.

xc, 18th, 2 a.m., Cleveland, Cincinnati, Chicago & St. Louis, Lena, Ind., a freight train collided with a car standing on the side track, fouling the main track, and the engine and 10 cars were wrecked. The engineman was killed.

eq, 18th, Chicago, Burlington & Quincy, Barstow, Ill., a freight train was derailed by a brake-beam which fell to the track, and several cars fell down a bank and were wrecked. Two tramps were killed.

o, 18th, Western Maryland, Glen Falls, Md., the engine of a freight train was damaged by the breaking of a side rod, and the fireman jumped off and was killed.

bc, 19th, Pennsylvania Lines, East Brook, Pa., butting collision of passenger trains, the engines meeting on a bridge; badly damaging both engines and several cars. One engineman was killed and 12 passengers and 4 trainmen were injured. An incorrect train order had been delivered to one of the trains, the receiving operator having failed to detect an error in the repetition of the order.

19th, 11 p.m., Delaware & Hudson, Harpersville, N. Y., a freight train was derailed by a landslide, and several cars fell down a bank. A brakeman was killed and three other trainmen were injured.

xc, 20th, 11 p.m., St. Louis South Western, Rusk, Texas, a freight train which had been detached from its engine, approaching a water tank on a descending grade, was not properly controlled, and ran into the engine, wrecking it. The engineman was killed.

bc, 20th, Lehigh Valley, Rochester, N. Y., butting collision of passenger trains, badly damaging both engines and three cars. Two passenger cars fell into a stream of water. One of the firemen was killed, three passengers were seriously hurt, and 34 others were somewhat injured. The collision took place a short distance south of the Rochester station. The conductor and engineman of the southbound train disregarded an order to wait for the other at Rochester. The conductor was injured in the wreck and was irrational for some time afterwards; the engineman appears to have admitted that he did not read the meeting order with care.

unx, 20th, Atlanta, Knoxville & Northern, Knoxville, Tenn., a locomotive was derailed and ran into a group of workmen in the yard; one of the workmen was killed and two others were injured, one of them fatally.

rc, 21st, New York & Long Branch, Sea Girt, N. J., a passenger train ran into the rear of a preceding freight, wrecking the caboose and overturning the engine. The engineman and fireman were injured.

xc, 21st, Pennsylvania Lines, Hudson, Ohio, a passenger train ran over a misplaced switch and into the head of a freight train, standing on the side track, wrecking both engines and several cars. One engineman and one fireman were badly injured.

unf, 22nd, 4 a.m., Southern Pacific, Lasca, Texas, a passenger train was derailed by a washout, and the engine and mail car were overturned. One trainman was killed and several passengers were injured.

o, 22nd, Baltimore & Ohio South Western, Ill., a freight train was derailed by the explosion of the boiler of its engine and several cars were ditched. The engineman and fireman were fatally scalded.

rc, 22nd, Pennsylvania Road, Portage, Pa., a freight train ran into the rear of a preceding work train, and the engine and 35 cars were wrecked. It is said that the freight was running in disregard of a caution signal, which had been given to it at the last preceding block station. Two trainmen were injured.

rc, 23rd, Long Island road, Rosedale, N. Y., a passenger train ran into the rear of a preceding freight, and the engine and several freight cars were damaged; 14 passengers were injured.

o, 23rd, 3 a.m., Pittsburgh & Western, Ravenna, Ohio, the locomotive of a freight train was wrecked by the explosion of its boiler; the engineman was killed and three other trainmen were injured.

bc, 24th, Delaware & Hudson, Putnam, N. Y., butting collision of freight trains, making a bad wreck. One trainman was killed.

*xc, 24th, 11 p.m., Pittsburgh, Cincinnati, Chicago & St. Louis, Trebeins, Ohio, an eastbound express train, running at high speed, collided with a car of coal which had escaped control in a yard by brake-rod parting and was running westward at 25 miles an hour. The engine, postal car and combination car were badly wrecked. The wreck took fire and five of the cars were entirely destroyed. The engineman, fireman and two postal clerks were killed and 16 passengers were slightly injured.

†unx, 24th, Baltimore & Ohio, McConnellsville, Ohio, a passenger train was derailed and one passenger car fell 40 ft. from a trestle. Two passengers were killed and 18 injured, six of them probably fatally.

*unx, 24th, Chicago, Rock Island & Pacific, South Omaha, Neb., a passenger train was derailed and the engine and baggage car were wrecked. The fireman was killed and the engineman injured. The wreck took fire and the flames were extinguished by the passengers and trainmen with water from the tender, which was ruptured.

*rc, 25th, 10 p.m., New York Central & Hudson River, Palmyra, N. Y., a freight train ran into the rear of a preceding freight, wrecking the engine and 10 cars. A man riding on the car next to the engine was killed, and the fireman was injured. The wreck took fire and several cars were burnt up.

xc, 25th, 9 p.m., Chicago, Milwaukee & St. Paul, Etter, Minn., passenger train No. 5 ran into some freight cars standing on the main track, and the engine was overturned. The fireman and a tramp were killed and the engineman and a mail clerk were injured.

rc, 26th, 1 a.m., Atlantic Coast Line, Dupont, Ga., rear collision of freight trains, one of which had stopped to take wood. The conductor and flagman were injured, the former probably fatally.

xc, 26th, Union Pacific, Cheyenne, Wyo., a westbound express train collided with a freight near the station, and four passengers and one trainman were injured.

rc, 27th, 11 p.m., Pennsylvania Road, Bamford, Pa., a freight train which had been unexpectedly delayed was run into at the rear by a following freight, and the engine and eight cars were wrecked. One trainman was killed and another injured.

unf, 27th, International & Great Northern, White House, Texas, a passenger train was derailed at a culvert which had been weakened by a flood, and two cars of freight were ditched. The fireman was killed and the engineman injured.

*rc, 28th, New York Central & Hudson River, Harrington Park, N. J., rear collision of freight trains, overturning one of the engines and wrecking several cars. The wreck took fire and was partly burnt up. The fireman was killed and a brakeman was injured.

xc, 28th, Chicago, Burlington & Quincy, Barstow, Ill., collision between a passenger train and a freight train, badly damaging both engines and derailing some of the passenger cars. Seven passengers were injured.

xc, 29th, Chicago & North Western, Escanaba, Mich., a passenger train entering the yard collided with a freight train, damaging the two engines of the passenger train and several freight cars. One trainman was killed and two trainmen and several passengers were injured.

dn, 29th, Atchison, Topeka & Santa Fe, Wootton, Colo., a freight train, being propelled by three engines, two ahead and one behind, broke in two while ascending the steep grade over Raton mountain; and in spite of the efforts of the trainmen at the brakes, the rear portion ran back down the grade, and, after running at high speed for three miles, was derailed at a high bridge. The engine, a very heavy one, and 28 cars fell to the valley at the side of the track. The cars were wrecked and the engine badly damaged. The men on the train, seeing that it would be impossible to stop it, jumped off; one of them was injured.

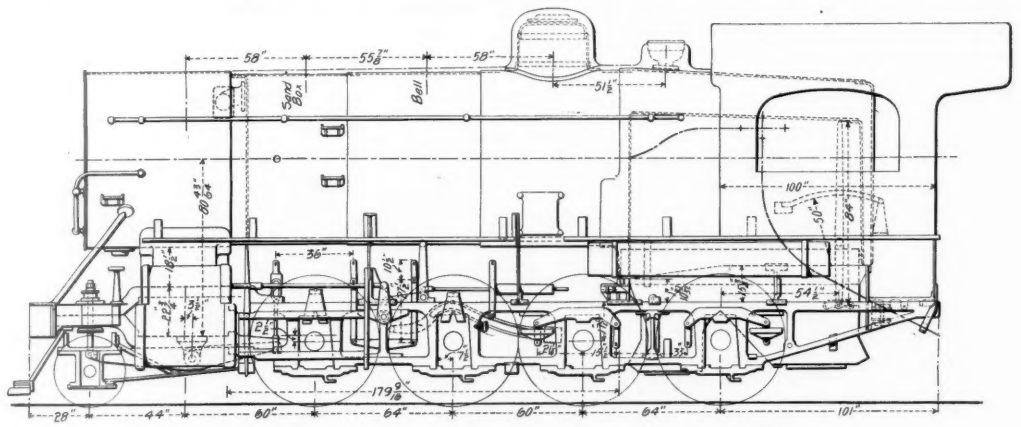
unf, 29th, New York, New Haven & Hartford, Cornwall Bridge, Conn., a passenger train was derailed at a washout, and four cars were ditched. Three trainmen were injured.

bc, 30th, Chicago, Milwaukee & St. Paul, Elm Grove, Wis., butting collision between a passenger train and a freight. One engineman was killed and one fireman injured.

dn, 30th, Philadelphia & Reading, Trenton, N. J., 14 cars of a freight train, which escaped control while being switched, ran at high speed down a grade and into the station building, which was mostly wrecked.

unx, 30th, Philadelphia & Reading, Pottsville, Pa., a freight train was derailed and several cars were wrecked. One brakeman was killed and one injured.

unx, 30th, Pennsylvania road, Pack Saddle, Pa., westbound mail train No. 11, running very fast, was derailed on a curve of 7 deg. 30 min. and the engine and all of the three cars were wrecked. The engine was badly crushed against the rocks of the mountain at the west side of the track; and immediately after, apparently in consequence of the explosion of the boiler, was thrown down the bank at the east side and fell into the Conemaugh River. The engineman was killed, the fireman fatally injured and three mail clerks and a brakeman less severely hurt.




Erecting Card of Consolidation Locomotive for Chicago & Alton.

## Some New Engines for the Chicago & Alton.

Ten simple consolidation engines of the kind shown by the engraving are being completed at the works of the Baldwin Locomotive Company for the Chicago & Alton. These locomotives are quite similar in design and appearance to the consolidations already in use by the Alton, except that the new ones are 11,000 lbs. heavier, the total weight being 200,000 lbs., of which 182,000 lbs. is on drivers. The driving wheels are 57 in. and the main driver journals are 10 x 12 in., the front middle and back being 9 x 12. The boiler is the straight top type, carrying 215 lbs. working steam pressure. The cylinders are 22 x 28 in., with piston valves. The tender is all steel, with channel iron underframe and arch bar trucks; the capacity is 7,000 gals. of water and 10 tons of coal, the loaded weight being 130,000 lbs. It is equipped with Westinghouse friction draft gear.

The Alton recently put some new mogul engines in service, differing from the moguls already in use only in the width of fire-box, the new ones having wide fire-boxes, and in the larger size of the drivers. The older engines of this type were built with 57-in. drivers and it was recently found desirable to increase the drivers on some of them to 62 in. This was accomplished by putting on an additional tire. This necessitated placing a liner under the cylinder casting to block down the equalizer fulcrum and the extension of the center-pin guide an equal amount; the rear end of the equalizer hanger was also lengthened by the same amount to compensate. The driver brake-shoes had to be moved ahead, requiring new fulcrums for the brake-shoe hangers and the lengthening of the connection to the cylinder-lever fulcrum to suit. The altered relative heights of engine and tender required remodeling of the chafing iron on the tender and off-setting the drawbar. These tenders were already provided with a false floor, so it was only necessary to lower this. The vertical clearance was provided for by shortening the stack and redesigning the steam dome cap, making it concave instead of convex. The details of the changes were worked out by Mr. J. F. Johnson, at that time Acting Mechanical Engineer.

The principal dimensions of the new consolidations are found in the following:

| | |
|---|---|
| Kind of fuel to be used | Soft coal |
| Weight on drivers | 182,000 lbs. |
| Weight on truck wheels | 18,000 lbs. |
| Weight, total | 200,000 lbs. |
| Weight tender loaded | 130,000 lbs. |

*General Dimensions.*

| | |
|---|---|
| Wheel base, total, of engine | 24 ft. 4 in. |
| Wheel base, driving | 15 ft. 8 in. |
| Wheel base, total (engine and tender) | 53 ft. 5½ in. |
| Length over all, engine | 35 ft. 1 in. |
| Length over all, total, engine and tender | 63 ft. 7 in. |
| Height, center of boiler above rails | 9 ft. 4 in. |
| Height of stack above rails | 15 ft. 2 in. |
| Heating surface, fire-box | 182.2 sq. ft. |
| Heating surface, tubes | 3,390.7 sq. ft. |
| Heating surface, total | 3,572.9 sq. ft. |
| Grate area | 54.5 sq. ft. |

*Wheels and Journals.*

| | |
|---|---|
| Drivers, diameter | 57 in. |
| Drivers, material of centers | Cast steel |
| Truck wheels, diameter | 30½ in. |
| Journals, truck axle, size | 6 x 10 in. |
| Main crank pin, size | 6½ x 7 in. |

*Cylinders.*

| | |
|---|---|
| Cylinders, diameter | 22 in. |
| Piston, stroke | 28 in. |
| Piston rod, diameter | 4 3/16 in. |
| Kind of piston rod packing | U. S. Metallic |
| Main rod, length center to center | 10 ft. 7¾ in. |
| Steam ports, length | 30⅞ in. |
| Steam ports, width | 1½ in. |
| Exhaust ports, length | 30⅞ in. |
| Exhaust ports, width | 3 in. |
| Bridge, width | 1¾ in. |

*Valves.*

| | |
|---|---|
| Valves, kind of | Piston |
| Valves, greatest travel | 5¾ in. |
| Valves, steam lap | 1 in. |
| Valves, exhaust lap | 1/16 in. neg. |
| Valves, lead in full gear | ⅛ in. |

*Boiler.*

| | |
|---|---|
| Boiler, type of | Straight |
| Boiler, working steam pressure | 215 lbs. |
| Boiler, material in barrel | Steel |
| Boiler, thickness of material in barrel | 27/32 in., 29/32 in., ⅞ in. |
| Boiler, diameter of barrel | 76 11/16 in. |
| Seams, kind of horizontal | Butt joined, sextuple seam, welded at ends |
| Seams, kind of circumferential | Double riveted |
| Thickness of tube sheets | ⅝ in. |
| Thickness of crown sheet | ⅜ in. |
| Crown sheet stayed with | 1⅛ in. stays |
| Dome, diameter | 31½ in. |

*Fire-box.*

| | |
|---|---|
| Fire-box, length | 9 ft. |
| Fire-box, width | 6 ft. ½ in. |
| Fire-box, depth front | 75¼ in. |
| Fire-box, depth back | 66¼ in. |
| Fire-box, material | Steel |
| Fire-box, thickness of sheets | ⅜ in. |
| Fire-box, water space, width | Front, 4 in.; sides, 3½ in.; back, 3½ in. |
| Grate, kind of | Shaking bars and drop plate |

*Tubes.*

| | |
|---|---|
| Tubes, number | 442 |
| Tubes, material | Iron |
| Tubes, outside diameter | 2 in. |
| Tubes, length over sheets | 14 ft. 9⅛ in. |

*Smoke-box.*

| | |
|---|---|
| Smoke-box, diameter | 80 11/16 in. |
| Smoke-box, length | 73¾ in. |

*Other Parts.*

| | |
|---|---|
| Exhaust nozzle | Single |
| Exhaust nozzle | Permanent |
| Exhaust nozzle, diameter | 5 in., 5¼ in., 5½ in. |
| Exhaust nozzle, distance of tip below center of boiler | 9 in. |
| Netting | Wire |
| Netting, size of mesh | 2½ per 1 in. |
| Stack | Taper |
| Stack, least diameter | 22 in. |
| Stack, greatest diameter | 22⅞ in. |
| Stack, height above smoke-box | 2 ft. 6 in. |

*Tender.*

| | |
|---|---|
| Type | Swivel trucks |
| Tank capacity for water | 7,000 gal. |
| Coal capacity | 10 tons |
| Kind of material in tank | Steel |
| Thickness of tank sheets | 5/16 in. and ¼ in. |
| Type of underframe | Channel iron |
| Type of truck | Arch bar |
| Truck bolster | Rigid |
| Type of truck spring | Triple elliptic |
| Diameter of truck wheels | 33 in. |
| Diameter and length of axle journals | 5 x 9 in. |
| Distance between centers of journals | 76 in. |
| Diameter of wheel fit on axle | 6⅜ in. |
| Diameter of center of axle | 5⅜ in. |
| Type of truck bolster | I-beam |
| Length of tender frame over bumpers | 23 ft. 8½ in. |
| Length of tank | 22 ft. 0 in. |
| Width of tank | 9 ft. 8 in. |
| Height of tank, not including collar | 6 ft. 3 in. |
| Height of tank over collar | 7 ft. 4 in. |

### Three-Pot Hopper Car.

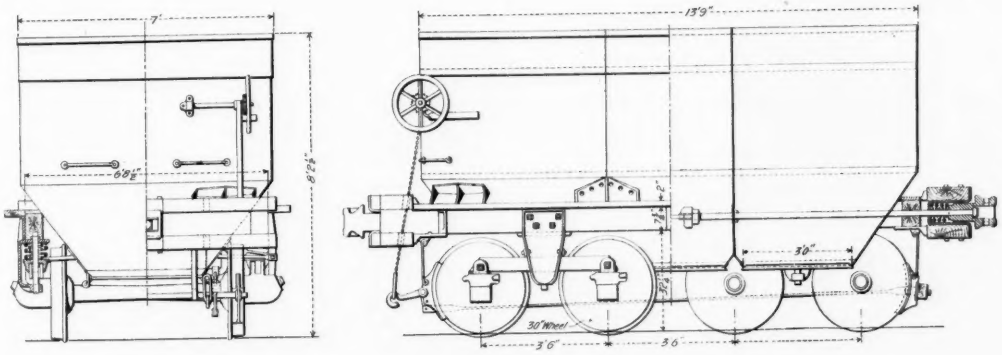
The illustration shows the second stage in the development of the steel coal car. It was primarily used by the coal companies operating on the line of the Cumberland & Pennsylvania for handling coal to be delivered to the Chesapeake & Ohio Canal. The car as originally designed had but two pots, and was carried on three pairs of wheels, equalized in a similar manner to that of the car shown.

These cars were used up to a few years ago on the

Three-Pot Hopper Car.

Baltimore & Ohio, in their seaboard trade, but the advent of the large wooden car, and the still larger steel "battleship," has relegated them to the scrap heap, and now of the thousands in use on the Baltimore & Ohio, Cumberland & Pennsylvania, George's Creek & Cumberland, and West Virginia Central Railroads, only about 175 are left in the service of the C. & O. canal trade.

The advantages of these cars were the excess of paying load over dead load, and the ease with which they were unloaded. The division of the car into practically three equal parts made the loading of the canal boats up to their carrying limit a much easier task than where the whole contents of the car had to be dumped at once. The capacity of the car illustrated was 26,000 lbs., and its tare 12,800




Three-Pot Hopper Car.

lbs. The last form of this car, used by the Baltimore & Ohio, had a capacity of 40,000 lbs., and a tare of 17,000 lbs. The objections to this car were its small capacity, and its weakness when run with the modern heavier car.

The above description and illustrations were furnished by Mr. H. T. Brück, Superintendent of Motive Power of the Cumberland & Pennsylvania.

### The United States Steel Corporation's Share of the Product.

Statements having frequently been made that the United States Steel Corporation practically monopolizes the production of iron ore, pig iron, and finished iron and steel in this country, we have thought it best to set before the public the exact facts, which will be found in the table. With the single exception of iron ore the statistics presented have been carefully compiled from the returns of production made to the American Iron and Steel Association for the whole of the calendar year 1901 by all the constituent companies of the United States Steel Corporation, including the period prior to its organization, and by all other iron and steel manufacturing companies. The statistics of iron ore shipments and production in 1901 have been obtained from the Corporation itself and from authentic data contained in our last Annual Statistical Report. All the figures given are complete and absolutely correct; nothing has been estimated. Quantities are in long tons.

| | U. S. Steel Corporation. | Independent companies. | Per cent. of U. S. Steel Corporation. |
|---|---|---|---|
| Iron ore from Lake Superior.. | 12,692,213 | 7,897,024 | 61.6 |
| Total of iron ore, 1901..... | 12,692,213 | 16,195,266 | 43.9 |
| Bessemer and basic pig..... | 6,460,847 | 4,584,796 | 58.5 |
| Spiegeleisen and ferromanganese ..... | 190,485 | 100,976 | 65.4 |
| All other kinds of pig iron not included above ..... | 152,656 | 4,388,594 | 3.4 |
| Total pig iron..... | 6,803,988 | 9,074,366 | 42.9 |
| Bessemer steel ingots and castings ..... | 6,113,588 | 2,599,714 | 70.2 |
| Open-hearth steel ingots and castings ..... | 2,746,996 | 1,909,313 | 59.0 |
| Total Bessemer and open-hearth ..... | 8,860,584 | 4,509,027 | 66.3 |
| Bessemer steel rails..... | 1,719,076 | 1,151,740 | 59.9 |
| Structural shapes ..... | 629,733 | 383,417 | 62.2 |
| Plates and sheets..... | 1,456,897 | 797,528 | 64.6 |
| Wire rods ..... | 1,059,859 | 306,075 | 77.6 |
| All other rolled products..... | 1,324,393 | 3,520,609 | 27.3 |
| Total of all rolled products. | 6,189,958 | 6,159,369 | 50.1 |
| Wire nails (kegs of 100 lbs.). | 6,446,938 | 3,356,884 | 65.8 |

That the reader who is not familiar with the iron and steel industries of this country may have a fairly adequate conception of their magnitude we present below a selected list of 25 of the largest producers of iron and steel which are in no way connected with the United States Steel Corporation and which are now operating their plants to their full capacity. A list of all the independent manufacturers would occupy too much space.

Republic Iron & Steel Company—27 rolling mills and steel works and 7 blast furnaces; also car axle works, coal mines, coke ovens, iron ore mines, etc.

Crucible Steel Company of America—11 rolling mills and steel works; also 3 blast furnaces and a steel plant now being erected by an auxiliary company.

Cambria Steel Company—Rolling mills, steel works, 6 blast furnaces, ore mines, coal mines, coke works, etc.

Pennsylvania Steel Company—Rolling mills, steel works, bridge-building plant, 7 blast furnaces, ore mines, etc.

Maryland Steel Company—Rolling mills, steel works, 4 blast furnaces, shipbuilding works, coke ovens, etc.

Bethlehem Steel Company—Steel works, rolling mills, forging plant, armor plate plant, and 4 blast furnaces.

Jones & Laughlins Steel Company—Rolling mills, steel works, 5 blast furnaces, chain works, ore mines, coal mines, coke ovens, etc.

Lackawanna Steel Company—Steel works, rolling mills, and blast furnaces now building at Buffalo to replace similar enterprises at Scranton.

Phoenix Iron Company—Steel works, rolling mills, bridge-building works, foundry, iron ore lands, etc.

Empire Steel & Iron Company—10 blast furnaces, iron ore mines, coal mines, coke ovens, etc.

American Iron & Steel Manufacturing Company—4 rolling mills, 3 bolt, nut and rivet works, etc.

Reading Iron Company—4 rolling mills, tube works, forge and foundry departments, and 2 blast furnaces; also ore mines, coal lands, etc.

Thomas Iron Company—10 blast furnaces and ore mines.

Lukens Iron & Steel Company—Steel works and 3 large plate mills; also coal lands.

Brandywine Rolling Mills & Viaduct Iron Works—Steel works, plate and sheet mills, and tube works.

Susquehanna Iron & Steel Company—5 rolling mills, 1 tube plant building, and 2 active blast furnaces.

Central Iron & Steel Company—3 rolling mills (1 leased to other parties) and 2 blast furnaces.

American Steel Casting Company (old organization)—3 steel casting plants.

Sharon Steel Company—Rolling mill, steel works, and 2 blast furnaces; also iron ore mines.

Wheeling Steel & Iron Company—4 rolling mills and steel works, 1 tube mill, and 3 blast furnaces; also coal lands.

Colorado Fuel & Iron Company—Steel works, rolling mills, 5 blast furnaces, including 2 building, ore mines, coal mines, coke ovens, railroads, etc.

Virginia Iron, Coal & Coke Company—2 rolling mills and steel works, 11 blast furnaces, iron ore mines, coal mines, coke ovens, etc.

Tennessee Coal, Iron & Railroad Company—3 rolling mills and steel works, 20 blast furnaces, ore mines, coal mines, coke ovens, etc.

Sloss Sheffield Steel & Iron Company—7 blast furnaces, ore mines, coal mines, coke ovens, etc.

Union Steel Company—Steel works and rolling mills about completed, and 2 blast furnaces building.—*Bulletin of the Iron & Steel Association.*

The New South Wales Legislature having approved the eight-hours principle, the system was commenced on July 1 in the working of the running staffs of the railroad and tramway departments of the colony. The cost of the change will be upwards of £60,000 a year. The men concerned are the enginemen, firemen and guards on the railroads, and the conductors, drivers and gripmen on the tramways. In the past these men have averaged 109 hours a fortnight, or about nine hours a day.

### The Ventilation of the Central London Railroad.

In the *Railroad Gazette* of July 25th just to hand there is a paragraph headed "Carbonic Acid in London Tunnels," extracted from the New York *Sun*, which deals with the question of the condition of the atmosphere in the Central London tube railroad and gives figures purporting to show that a great excess of carbonic acid gas is generated. These figures may or may not have been correct at the time the information drawn upon was compiled, but it is fair to the management of the road to say that during the past few months they have supplemented what the extract in question describes as the automatic ventilation ("by reason of each train nearly filling the tube and acting like a piston") with an experimental method of exhausting the stale air every night and admitting fresh.

It happened that, at one of the stations—Bond street—about the middle of the railroad, there was an unused chamber alongside and slightly below the level of the tunnels, and connected to the surface by a shaft, which was constructed to serve as a sub-station for the electrical machinery but was not wanted for that purpose owing to there being sufficient sub-stations elsewhere. In this chamber a powerful fan has been installed, driven by an electric motor, and every night after the traffic has ceased running—i.e., from 1 a.m. to 5 a.m.—this fan is set in motion. At the same time air-tight doors made of canvas and provided for this special purpose are closed at every station so as to completely shut off the lift and staircase shafts from the tunnels. The only exception is at the Post Office station, the last but one at the eastern end of the line, where the corridors are left open to admit fresh air from the shafts as the stale air is drawn out by the fan. A similar admission of fresh air takes place at the western terminus of the line, Shepherd's Bush, where the tracks rise out of tunnel to a surface depot for the storage and repair of cars. At the Bank, where the other terminus of the line is situated, there is no direct communication with the outer air either by tunnel or lift shafts, as the latter give egress to a system of underground corridors constructed beneath the streets to facilitate the foot traffic at this very busy center. This is believed to be the main reason of the failure of the piston-like action of the trains to give a complete change of air.

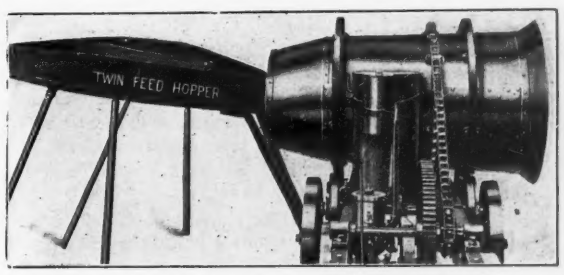
At the last semi-annual meeting of the shareholders of the railroad held in London, the chairman claimed that by means of the Bond street fan the whole of the air in the tunnels was renewed every night. Personally I should doubt whether the single fan at Bond street is quite powerful enough to effect so much, but probably the chairman was justified in claiming that the atmosphere in the tube was as good as that of any other tunnel in London. He stated at the same time that the directors had given facilities to the London County Council to make an analysis of the atmosphere, and that, although the report of the council had not yet been received, they were justified in believing that it would be favorable.

It is a little curious that no ventilation problem has cropped up on the City & South London tube, which since its last extension is a mile or two longer than the Central London, and of which the tunnels on the older section are of less diameter. This may be because this line has never had a cased-in terminus like the Bank station of the Central London, all its lift shafts admitting direct to the outer air. But probably the chief explanation is that the City & South London serves a part of London the population of which is poor compared with that of the wealthy "West-End" served by the Central. So long as they can get to and from their work expeditiously and safely, the patrons of the South London tube cannot afford to worry about the atmosphere they breathe *en route*.

London, Aug. 6, 1902. C. H. G.

### Feed Hopper for Concrete Mixer.

A new feature has recently been added to its concrete mixers by the McKelvey Concrete Machinery Co., Chicago. It is a twin-feed hopper, shown in the accompanying engraving. Its object is to furnish more steady and uniform feeding for the large size mixers than is possible with a shovel. These mixers may be fed in various ways, depending on the nature of the work, capacity, etc., and may be placed to deliver directly into the trench or forms, or into wheel-barrows. They are made in sizes ranging from 3 cu. ft. capacity an hour up; the smallest sizes being easily carried by hand, and the larger, mounted on wheels or trucks, may be moved by men or horses. A neat little working model of one of these mixers was exhibited at the last meeting of the Railway Engineering and Maintenance of Way Association.




McKelvey Concrete Mixer.

RAILROAD GAZETTE

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## EDITORIAL ANNOUNCEMENTS.

*CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

*ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

*The Chronicle* has compiled gross and net earnings of railroads for the half-year to June 30. The returns are for roads covering 155,224 miles. The gross earnings aggregate 670 million dollars and the increase in gross is 39 millions, or 6.16 per cent. The increase in net is 3.81 per cent. Of course, the reader has in mind the fact that these comparisons are made with an earlier year of great prosperity. It also comes after a season of short crops. Grain movement, live stock movement and cotton movement all fell off, so the gains are a sign of the great movement of manufactured products and merchandise. The anthracite strike had begun to affect some of the roads before the end of the half-year, but that effect will be more apparent in the report of the second half-year.

The New York, New Haven & Hartford is building additional freight houses and sheds at Fall River, which will increase its storage facilities for cotton three-fold. This item we take from a letter published in the *Boston Transcript*, and we need not remind the reader that it is an encouraging bit of evidence of the good that is being done by the use of a rational basis for the payment of car service. From the same letter it appears that one great cause of the congestion of cotton which has prevailed at Fall River for years, has been the widespread custom among spinners of buying their cotton through local brokers. It is the old story of men whose total facilities consist of one desk, undertaking to do a business requiring yards and store houses. Cotton is white and coal is black; but cotton, coal, potatoes, lumber and hay are all alike in being a burden on railroads and on legitimate dealers. It is said that the New Haven road has at times had on hand 2,000 carloads of cotton for Fall River mills at once. It is also said that during the past year the average detention of cotton cars on the company's lines has been 45 days; and at Fall River it must have been worse than this, for the average of the whole road would include Providence, where the spinners buy direct from the cotton fields and where the abuse of cars has not been so bad. Under the per diem rule a car standing 45 days costs $21; and, as the *Transcript* writer points out, this would compel the New Haven road to pay a definite sum of money for the privilege of carrying the cotton, for its average gross receipts per car of cotton are less than $20.

Since writing the above we learn that the Boston & Maine announces that it is ready to restore the through rates on cotton by rail from the southwest, the mills having made some sort of agreement to pay for the use of cars. Apparently they agree to pay per diem on the cars if not unloaded after a certain period, six days, we believe. This would seem to be a very reasonable proposition—as a temporary expedient—though it will probably seem anything but reasonable to the factories. Where they have been getting cars, say, 16 days for nothing, they would pay per diem charges of $2 (10 days at 20 cents), which looks large. But as compared with the actual value of the car and the ground it occupies, the sum is small. Cotton men should pay as much as other consignees for the use of box cars; that is, from 50 cents to $2 a day, after two days; and probably the same is pretty nearly true as regards consignees of coal. Therefore, we say that a 20-cent charge is commendable only temporarily. It is also said that the Boston & Maine is building a cotton shed 594 ft. x 60 ft. at Boston. This would be more useful for cotton coming to Boston by sea than for that coming through Hoosac Tunnel; but once the principle is recognized, we may expect to see new storehouses at Lowell, Manchester, Biddeford and all through the large mill cities. Thus we may see this alleged Gordian knot untied in less time than it has taken to discuss its terrors. The fact that the Boston & Albany has continued to take cotton into New England at the old through rates appears to have had something to do with this early solution of the difficulty.

### English and American Railroad Employees.

One of the most serious, because apparently the most irremediable, annoyances of the division superintendent and trainmaster is the recurrence every year of violent fluctuations in business which, in Spring or Fall, or at some other time, upset all the officers' calculations as to what or how many men ought to be assigned to any given service. The superintendent of a road doing a large Summer excursion and seashore business stated recently that every year, in the month of May, he had to employ over *nine hundred* new men, half of them trainmen. His force of enginemen has to be more than doubled; and there is only a small force of freightmen from which to draw recruits for the passenger service. Every Autumn many roads have to increase their freight train forces, though not many have to add such a large *percentage* as the 900 represents. For the last few years most large roads have had to be taking on new men about all the time, because of the constant and general increase of business.

With such a condition, the maintenance of a rigid rule to entrust the management of a train only to thoroughly instructed, experienced and trustworthy men is difficult. A correspondent calls attention to this fact by way of criticism of the comparison with England, which appeared in the article on the first page of our issue of July 18.

In that article, setting forth the discreditable record of butting collisions which the railroads of this country are now compelled to see printed by the Government every three months, it was pointed out that on the railroads of Great Britain passengers are very much safer than in America. (The same is true also of employees). Our correspondent says that this comparison is unfair. The English roads have a traffic free from the violent fluctuations that we have to contend with, and therefore can more readily and reasonably provide competent men for every duty on every occasion. In this country we cannot do this without keeping large forces under pay, in idleness, when business is dull, and therefore it is not reasonable to demand such a high state of efficiency as is found in England.

This explanation of the difference in the respective safety-records is interesting and plausible, as an explanation, though it can hardly be called an excuse or justification; and even as an explanation it is not so well founded as it may at first seem. The English roads do have great rushes of passenger business in the holiday season, and to that extent have occasion as we have to work their men at high pressure. In the second place their freedom from collisions cannot be attributed wholly to their having men who are more thoroughly trained and tested; it is accomplished largely by a radical difference in principle; by the use of the space-interval where we use the time-interval and flagging. As has been many times pointed out in these columns, the block system, where adopted, makes a great improvement in American railroad service whether the men are improved or not improved. It goes without saying that a large share of the difficulties discussed in the article of July 18 would be completely cured by the adoption of the block system. The article was merely a challenge to those who do not adopt the block system to "show cause."

The chief difference between the personnel of the English train and station service and that of American railroads lies, no doubt, in the deep-seated difference in the whole social fabric of the two countries. There the engineman, conductor or signalman is from 10 to 40 years older than the man whom we find in the same position in this country. The United Kingdom is not rapidly growing, and these men cannot get promoted or get good paying jobs elsewhere; and so, practically, every locomotive, every "brake-van" and every signal cabin on the English high-speed railroads has in it a man of long experience. These two factors, the block system and keeping good men in their places, explain much of the difference between the American and English results that we are now considering; though others do have their effect. The recognition of the principle of apprenticeship—the employment of "lads" in signal cabins, yards, roundhouses and other places—aids powerfully in the inculcation of correct methods of work.

In so far as our imperfections are due to sudden increases in business and the consequent necessity of entrusting men with duties that they have not been fully educated in, or of working them long hours when, by reason of their inexperience, they ought to work only a moderate number of hours, the defense is, presumably, that more thorough inspection would not be the most appropriate remedy. There can be little satisfaction in getting reports that your men are taking risks, if you are compelled to let the men work right along in the same service. It might be argued that the men will correct their bad habits in reasonable time without inspection; that the trouble is not in their lack of clear brains or methodical working habits, but is in the unreasonable requirement; the requirement that they shall learn new duties in too short a time. Our correspondent does not put this thought in words, to this extent; but the line of reasoning is warranted by the practice of many roads.

But, whatever may be the reasons why we have more personal casualties than they have in England, it is quite plain that the American public will accept no such explanation as that offered by our correspondent. It is true that the public is in many things unreasonable; but the public rules, finally, and will enforce its wishes if it can learn how to do so. The unreasonableness of the public was shown in 1893, when it clamored for low rates to Chicago. The railroads yielded, used untrained, inexperienced or overworked men, and had a lot of collisions. The correct public sentiment would be, no doubt, to the effect that the railroads were responsible for not resisting the demand for low rates. But a railroad manager who should resist would then be denounced for not having an ample force of well-qualified men and an ample supply of cars and other facilities, so as to be able to take a few thousand extra passengers to Chicago on any day, in summer or winter, in 1893 or any other year.

This theory means, in practice, that the manager who needs 500 more trainmen in summer than in winter, must keep these men employed all the year round. On most roads that would be impracticable. Theoretically those men could be paid by the trip, and so assigned as to work, say 12 to 15 hours a day in the summer and 6 hours in winter; but practically the men would be likely to force an increase in rates so as to get nearly or quite as good pay for a six-hour day in the dull season as they receive for an average full day at present.

As we remarked at the outset, this is a difficult question, and we do not pretend to offer a remedy, except the expensive one just mentioned; and we cannot tell the railroad manager where to find the money to carry that one out. But, of course, no one is going to say that nothing can be done. There is an ample field for improvement. An illustrative example of the application of the correct principle and of what it costs may be found, by those whose memories are long enough, in the situation on the Burlington road in 1888, when nearly all of its locomotive runners struck. The company determined to fill the places of the strikers with new men, and at the same time to maintain a rigid standard of qualification; though there was a powerful temptation to relax the requirements, for every hour's delay in the resumption of business meant an enormous loss. Moreover, with such a straight and level road as the Burlington the risks involved in putting on green men were not so great as would be the case on many lines. But the temptation was not yielded to, and business was resumed with a remarkably short list of train-accidents. The delay involved in examining and testing the new men cost many thousands of dollars, no doubt; and that was an item of pretty direct expense in securing safety; but the management had the courage to incur the expense.

Of course, if you demand a larger number of good men than there are to be had, you will have to wait a year or two before you can carry out your theory,

or you will have to increase the pay; or may have to do both. But is not this the logical remedy for that insomnia which afflicts the sensitive superintendent when he has a lot of untried men in the train service?

To habitual readers of the *Railroad Gazette* it will be trite, if not tiresome, for us to here suggest the more general use of the block system. It relieves enginemen from watching anxiously for red flags and lights, because the danger signals are always encountered at fixed spots (the block stations). It does away with shirking duty by the flagman, because he—that is, the signalman, who is the real flagman—is on duty all the time, and cannot run away. The signalman finds it easier to do his duty than to evade it. It substitutes a few simple things for a variety of duties which are difficult or unpleasant or hard to understand. The manager who has to employ scores of new men on short notice has very diverse perplexities; no one denies that; but the block system will cure a larger share of the worst ones than can be cured by any other one thing.

The suburban railroad alluded to at the opening of this article also affords an instructive example. It is the Long Island Railroad. We do not understand that the Long Island pays any higher wages than are paid by other roads in the same region, nor that it has any more collisions than other roads. It seems to maintain an excellent record under most difficult circumstances. It must be that the superintendents and trainmasters do an enormous amount of educating and watching. They must do a good deal even if they do no more of this kind of work, per man, than is done by the average officer. Their case is more difficult than that of officers whose fluctuations are in the freight traffic, for it is known beforehand that most of the new men must leave the service in a few months, and the percentage of increase in the forces is larger. It is hard to get good men for a single summer.

Inquiry of the officers of the Long Island elicits the reply that the things to be done to make a safe and efficient force out of new men are good judgment in selection, patience and care in training, and constant watchfulness against the cases, all the time liable to arise, where, on the unexpected absence of a regular experienced man, a man of insufficient experience is assigned. In a word, the things done on the Long Island are the same as those which have been preached in the *Railroad Gazette;* so that we have nothing new to say about them. It is fair to add, however, that the heavy traffic of the Long Island road is done within a small territory, thus obviating some of the difficulties that exist on long and thin lines. With a dense traffic men learn much from one another and learn to avoid many errors by the abundant practice; and inspection is much easier. In this respect the Long Island is somewhat in the same situation as many English lines. But, of course, the only rational lesson that the superintendent of a thin road can get out of the contemplation of these differences between his road and roads leading to New York City or London, is that, if he wants equally good results on his own lines, he must put forth correspondingly greater energy, in the directions in which these more fortunate men have found their success to lie. If you can see all your men every day you can accomplish certain results; if you can see them only once a week or once a month, much more time, care and money will be necessary to accomplish the same results. If conscientious new men can be constantly learning from older ones they will become expert in much less time than if the old and the new are isolated from one another by the infrequency of trains and the length of the road. But, of course, you are just as desirous of a perfect record on your thin or remote railroad, as though you were running the Manhattan Elevated.

## The Railroads of Cape Colony.

The report of the General Manager of the Cape Government Railways for the year 1901 is just received; it bears date of May 1st. The capital entitled to interest amounted to £22,125,085, and on this there was earned net 4.4 per cent. The year before, the net earnings had been 6¼ per cent. There was actually an increase of gross revenue; but there was a still greater increase in expenditure, which increase amounted to £677,366. The greatest single item here was in the locomotive department, which accounts for almost one-half of the increased expenditure. The increase is ascribed to the high price of coal, the cost of patroling the line, increased wages, greater number of train miles run, and finally, overtaking arrears of repairs to line, rolling stock and buildings. This latter was an important item, for during the war, repairs had necessarily fallen much behind. The great drain on the capacity of the system had kept men, rolling stock and track intensely occupied in carrying on the current business. The greater cost of coal was also largely due to the war. As is well known, local mines were long shut down or in the hands of the enemy; while the prices of English coal were greatly increased.

Interruptions of the railroads were less in 1901 than in 1900; but the night running of trains was frequently forbidden and the demands for military transportation were even greater than in either of the years preceding. Military movements on a large scale suddenly diverted great quantities of rolling stock and closed the line to civil traffic. Fully three-fifths of the resources of the department in engines and vehicles were employed for war purposes. The results, therefore, considering the interruption to civil traffic and considering the heavy expenditures for repairs, appear to have been good.

A large addition has been authorized to the rolling stock in engines and in freight cars. In the 26 months ending with the end of the year under review, the Cape Railways imported and bought of local builders 68 engines, and 65 were under order and yet due to arrive. Seventeen engines had been scrapped, leaving a net increase of 116. Further, the Rhodesia Railway Company has imported 16 heavy engines, which are now working on the lines of the Cape Government Railways. Obviously, the increase in motive power is not properly measured by the number of locomotives, for the capacity of the individual engines has been largely increased. All of this is true, but in a smaller proportion, of freight car equipment.

The Chief Locomotive Superintendent gives some particulars of recent progress in increasing the motive power. The principle of standardization has been carried far, perhaps farther than anywhere else. Early in 1900 he got out a design for an eight-coupled freight engine, two of which were ordered in that year at the Schenectady Locomotive Works and these were put to work in March, 1901. "They have fully answered expectations." A further order for 14 similar locomotives was in hand at the time of writing the report. Twenty-three locomotives, somewhat like these but with a four-wheel leading bogie and a shorter fixed wheel base, were under order in England. These two types will be the standard freight engines for some time unless they are superseded by some modification of the Atlantic type, wide fire-box locomotive. Eight six-coupled locomotives were supplied by the Schenectady Works in addition to the eight-coupled engines mentioned above. "These are well designed, serviceable, smooth-running engines." Ten six-coupled locomotives similar to these were supplied by the Baldwin Works and 21 by Neilson, Reid & Co. Of 56 locomotives imported during the year reported on, 30 were from Neilson, Reid & Co., 10 from Schenectady, 10 from Baldwins, and six from Sharp, Stewart & Co,

Mr. Beatty thinks that wooden underframes must gradually disappear from the car equipment. Steel underframes require little repair but, apparently, he is not certain about all-steel cars; they are not likely to be rapidly introduced for they will require the substitution of a new class of workmen and new machinery to take care of repairs.

Locomotive repairs have been augmented by the bad water. Brass tubes have been found more satisfactory than either steel tubes or those of part copper. The American locomotives are fitted with iron tubes, but it is too soon to know how these will answer; so far, the results with them have been fairly encouraging.

The General Manager gives a little table designed to show something of the intensity of the movement in and out of Cape Town. The number of trains daily in and out of the Liverpool street station of the Great Eastern Railway in London is given as 784. This is the most largely used station in the world. Besides the Liverpool street station, there are four London stations where the train movement is upwards of 400 trains a day. At the Cape Town station there are 260 trains in and out every day, while at the Paddington station of the Great Western, in London, the trains in and out are 173; at Euston station, London & North Western, and at St. Pancras, Midland, 123.

In view of the large movement at Cape Town, the General Manager recommends the investigation of power systems of interlocking to relieve the heavy manual labor required there now. He suggests that three systems should be examined and the railroad companies using them should be asked for expressions of opinion, namely, the electric at Crewe (London & North Western), the electro-pneumatic at Spitalfield (Great Eastern), and the low pressure pneumatic at Grateley (London & South Western). The General Manager is disposed to think that the low pressure will be the easiest and cheapest to maintain but the most expensive to install.

Considerable progress had been made during the year in putting up fixed signals and in interlocking. Four sets of automatic electric signals recommended by Sir Charles Elliott, had been ordered for trial; and if these are satisfactory, further automatic equipment will be bought at once. Beyond that, trials were going on of Tyer's tablet system and of the Webb & Thompson staff system.

Considerable work is authorized in the way of reduction of grades, and along with this goes relaying the lines with heavier rails. It is recommended that 85-lb. rails be put down on the main lines, using the lighter rails taken out for branch lines. It is probable, further, that some double-tracking will be undertaken at once.

## A New Method of Measuring Angles.

*Engineering* (London) of July 25 devotes five columns to "Fergusson's Surveying Circle and Percentage Unit of Angular Measurement." This new method consists in dividing a semi-quadrant of a circle into 100 unequal parts, so that the distance from the zero point to any division is proportional to the tangent of the angle. Thus if the circle be turned through 15 divisions, it is known at once that the angle is one that has a trigonometric tangent of 0.15. By placing a rod at any distance from the instrument and normal to the line through the center of the circle and the zero point, that distance becomes at once known by reading the distance subtended on the rod between any two division marks.

This method has been used in this country to a slight extent in certain clinometer and gradienter instruments for measuring vertical angles, but Mr. Fergusson uses it for both vertical and horizontal work. For the latter case he divides one-half the circle into degrees in the usual manner, while the four octants of the other half are divided into unequal parts in the manner above described. Of course no vernier is possible for this unequal graduation, and hence the method is limited to cases where only a low degree of precision is required, as in common land surveying.

The inventor was led to devise this method in order to avoid the use of tables for reducing stadia measurements, and it can probably be successfully used for stadia work as far as the horizontal distances are concerned. For the differences of elevation, however, computations are still necessary, which are nearly as laborious as those required by the use of tables. Graphical methods of reducing stadia observations, which are in general use in this country, obviate all computations and leave but little to be desired. The application of Mr. Fergusson's new circle to horizontal angle work appears to introduce no features of simplification, because the angle itself, not its tangent, is almost always needed. He deserves credit, however, for having worked out the idea very thoroughly.

## July Accidents.

We publish in another column of this issue a condensed record of the principal train accidents which occurred in the United States in the month of July. The record contains accounts of 44 collisions, 24 derailments, and 4 other accidents. Those which were most serious, or are of special interest by reason of their causes or attending circumstances occurred as follows:

| | |
|---|---|
| †3d, Glenshaw, Pa. | 19th, East Brook, Pa. |
| ‡4th, Richmond, Ind. | 20th, Rochester, N. Y. |
| 4th, Albany, N. Y. | 24th, Trebeins, Ohio. |
| 17th, Mineola, Texas. | †24th, McConnellsville, Ohio. |
| *18th, Pembine, Wis. | 30th, Pack Saddle, Pa. |

The most notable of these were Trebeins, Rochester, McConnellsville and Pack Saddle. At Trebeins the speed of the passenger train was, according to reports, over 60 miles an hour. The flames enveloped the wreck in three minutes. The men responsible for the Rochester collision were arrested and held on charges of manslaughter. The train which was wrecked at Pack Saddle was the fast St. Louis mail, which has lately made some of the fastest long distance runs in the world; as, for example, 99 miles over the difficult Pittsburgh Division in 99 minutes. Reports were freely circulated that the derailment was due solely to excessive speed, though we do not learn that this is anything more than conjecture.

On the Sonora railroad, in Mexico, July 24, a passenger train was wrecked at a washout and five persons were killed.

The number of electric car accidents reported in the United States in July was 19, in which 19 persons were killed and 140 injured. The worst of these accidents, that at Gloversville, N. Y., on the 5th, killing 13 persons, has already been reported in the *Railroad Gazette* (page 610). A butting collision reported from New Castle, Pa., killing three, was said to have been due to the failure of an electric-light block signal; but the statement is disputed.

At Pittsburgh the trolley express business will soon be a thing of the past. According to a statement published in the *Pittsburgh Dispatch* the Pittsburgh Express Company, running 10 electric street cars and 10 wagons, is to go out of business on September 30. It is said that this move is due to the fact that a State law forbids the running of express or freight cars over a passenger street railroad, and to the activity of the Pennsylvania Railroad in prosecuting the company for violation of this law. The express company was organized about four years ago. For the first two years it did not do a very large business and the Pennsylvania took no measures to interfere with it, but for the last two years it has been prosperous, and it is said that many merchants will greatly miss the prompt and quick service which it has given. The principal points to which cars were run outside of Pittsburgh were East Liberty, Homestead, Braddock, Turtle Creek, McKeesport and Carnegie.

## NEW PUBLICATIONS.

*Some Recent Developments in Locomotive Practice.* By C. J. Bowen Cooke, Assistant Running Superintendent, Locomotive Department, London & North Western Railway. Octavo, 76 pages; many illustrations. London and New York: Whittaker & Co., 1902. 2s. 6d.

For many years it has been the custom of the Commandant of the School of Military Engineering, at Chatham, to invite gentlemen having special information, to deliver a few lectures before the officers of Royal Engineers and the engineering pupils gathered there. These lectures have given rise to several useful

books, one of which at least has become a little classic, namely, the late Sir George Findlay's "Working and Management of an English Railway." Last year Mr. Webb, of the London & North Western, was invited to give two lectures on "Recent Developments in Locomotive Practice," but the pressure of his duties was such that he asked Mr. Cooke to take his place. The little volume now before us is an adaptation of those two lectures. It was prepared for the purpose of giving a rapid and general view of a great subject in a very compact way, and by the aid of lantern slides, therefore the reader must not expect exhaustive treatment. But within the necessary limitations of its origin, this little volume will be found interesting and useful by many readers on this side of the ocean.

A few pages, with several interesting but pretty well-known pictures, are given to the early history of the locomotive; then the conditions governing general design are taken up, and then follows description of practice in the details of frames, boilers, cylinders, valve gear, and so forth. The scheme is to briefly describe present practice with such drawings as are necessary to convey accurate notions, and this scheme is successfully worked out. If the title were amended by putting the word "British" before "Locomotive" it would be more accurate; but every open-minded American designer and student of locomotives wishes to know British practice, for he realizes that from the British designers and builders we have learned much in the past and may learn even now. Self-satisfaction has ever been the most costly weakness of our race on both sides of the Atlantic. Possibly the younger branch of the race has a little less of it than the elder.

*The Treatment of Steel.* A compilation from the publications of the Crescent Steel Co., on heating, annealing, etc. Also a chapter on hardening and tempering. 12mo. 162 pages. Illustrations. Pittsburgh: The Crucible Steel Co. of America. 1902.

This is the third edition of the Treatment of Steel, a book originally issued by the Crescent Steel Co. This edition has been remodeled and revised. A new introduction has been written; several engravings have been added, with plates showing the effects of heat upon steel; explanatory footnotes have been introduced; also a new chapter on Self-Hardening Steel; and finally, an excellent index has been added.

*A Mechanical Index—Machine Tools.*—Last June, page 448, we described at considerable length a new enterprise of the Industrial Press, 9 Murray street, New York City, in issuing an index to machine tools, woodworking machinery, electric and steam appliances, and so forth. At that time, Section A—Machine Tools, was issued. We now have a new edition of the same section. It is an octavo pamphlet of 160 pages and is sold for $1.

## TRADE CATALOGUES.

*Concrete Mixers.*—Kaltenbach & Griess, Consulting and Contracting Engineers, Cleveland, Ohio, send us a new catalogue of "K G" concrete mixers, describing the machine, and giving views and notes of a few plants where it is used. The standard machines are built in two sizes—4 ft. and 5 ft. cubes. The smaller machines mix single batches of 1 cu. yd.; the large machines mix 1¾ to 2 cu. yds. There are records of 262 cu. yds. in 10 hours with one of the small machines, and 375 with the large ones, but this varies greatly with local conditions, and facilities for handling the material to and from the machine. A portable mixer is shown mounted on a platform car; also a floating plant for the Buffalo Dredging Co.

*H. B. Underwood & Co.*, Philadelphia, Pa., have just issued a 50-page illustrated catalogue of the special tools for railroad and repair shops made by the L. B. Flanders Machine Works. The list includes both portable and stationary appliances. It also contains a number of handy rules and tables for the use of engineers and machinists.

*Opportunities for Business* is the title of a little folder issued by the Chicago & North Western as a supplement to North Western Series No. 11, 1902, containing a list of new towns and business opportunities. The new line from Evan to Marshall, Minn., recently opened by the North Western, has six new towns on it, viz.: Dudley, Milroy, Lucan, Rowena, Clements and Wayburn, all in a highly productive farming country and furnishing excellent opportunities, so the folder states, for parties desiring professional or business openings. Also the Fremont, Elkhorn & Missouri Valley, of the North Western system, is extending its line from Verdigne, Neb., to Bonesteel, S. Dak., via Niobrara, Neb., and three new towns are located on this line in the Ponca Valley. These towns are Monowi, Bristow and Anoka.

## Foreign Railroad Notes.

According to a press despatch of Aug. 27, the London & North Western has put on a train between London and Birmingham, 113 miles, to run through regularly in 115 minutes. The train usually consists of five cars weighing about 130 tons.

The English rules prepared by the Board of Trade under the Prevention of Accidents Act of 1900 have been put into effect. The subjects to which the rules refer are: (1) Labeling wagons; (2) Movement of wagons by propping and tow-roping; (3) Power-brakes on engines; (4) Lighting of stations or sidings; (5) Covering of signal rods; (6) Construction and protection of gage glasses; (7) Arrangement of tool boxes on engines; (8) Provision of brake vans for trains on running lines beyond the limits of stations; (9) Protection to permanent way men when relaying or repairing permanent way. The rule as to brake levers will, in accordance with the recent decision of the Railway and Canal Commissioners, be modified and brought forward later.

## The Pennsylvania Railroad in New York City.

On Wednesday of this week a conference was held between officers of the Pennsylvania Railroad and a joint committee of the Board of Aldermen and the Board of Rapid Transit Railroad Commissioners of the City of New York for the purpose of considering a revised form of franchise for the Pennsylvania tunnel line. At this meeting the following letter from Mr. Cassatt was presented. It is addressed to the chairman of the joint committee:

"The franchise granted by the Board of Rapid Transit Railroad Commissioners to the Pennsylvania, New York & Long Island Railroad Company, covering the construction of a tunnel railroad, by means of which the system of the Pennsylvania Railroad Company, as well as the Long Island Railroad Company, will be extended to a centrally located station in the City of New York, having been disapproved by the Board of Aldermen, and the question of an amended franchise being now before your Joint Committee, to ascertain what further conditions should be attached to the grant in order that the interests of the city may be more fully protected, the Pennsylvania Railroad Company, which owns the entire capital stock of the Pennsylvania, New York & Long Island Railroad Company and has to furnish the funds for the undertaking, aggregating about $40,000,000, desires to supplement its views, presented to your committee on Aug. 5 last, with the following statement:

"The great benefits which the extension of the Pennsylvania Railroad system will bring to the city of New York are so generally recognized that it hardly seems necessary to refer to them here. Not only will the city obtain another direct all-rail connection with the West and Northwest, to reach which it has now but a single railroad line at its service, but it will also secure a direct all-rail connection with the national capital, and with the great railroad system of the South and Southwest, a section of the country now rapidly developing, and whose trade with the Eastern seaboard cities must proportionately increase, so that the advantages to the city of New York which greater convenience of access will afford the people of that section, must be of inestimable value.

"Neither does it seem necessary to dwell upon the benefits which the city will derive from a direct rail connection with Long Island, through which its citizens will not only have easy and rapid access to a territory admirably adapted on account of its reasonable cost and healthful conditions for homes for its working people, but also to the attractive resorts located on its sea and sound shores, and to interior points having special inducements for country residences.

"The Pennsylvania Railroad Company asked the city to do two things in furtherance of this project, namely, to grant a right of way under Thirty-first, Thirty-second and Thirty-third streets, and to close Thirty-second street between Seventh and Ninth avenues.

"Since the tunnels are to be constructed at such a depth below the surface as not to interfere with any use the city can make of the streets, or to obstruct any future rapid transit lines under the avenues, and as in granting the right of way the city is in fact not parting with anything of which it could make use, the Pennsylvania Railroad Company believed that the city, in consideration of the great benefits it would derive, would grant this right of way without charge, or for a nominal consideration during the first period fixed by the law. It was thought also that consideration ought to be given to the fact that this is not a merely intraurban railway project, whose revenue would be collected from the people of New York, but the extension of a trunk line whose income must be largely derived from the transportation to and from the city of persons residing beyond its limits. The Rapid Transit Commission having, however, demanded a substantial compensation or rental for the right of way, the Pennsylvania Railroad Company was obliged to yield to its insistence, and has accordingly agreed to pay annually for the right of way under the streets and for the sub-surface occupancy of the street adjoining the station an average sum for each year of the first period of 25 years, which capitalized amounts to $2,000,000. It is submitted that such a payment has never been made to any city in this or any other country for such a purpose.

"As a terminal station of adequate capacity could not be built within the limits of two east and west streets, it was necessary that Thirty-second street between Seventh and Eighth avenues, and between Eighth and Ninth avenues, should be closed. The Pennsylvania Railroad Company offered at the outset to pay a fair price for the land embraced in the parts of the streets vacated, based largely upon such vacation, and it was agreed that its valuation should be ascertained through the prices paid by the Pennsylvania Railroad Company for the abutting property, and upon this basis the price was fixed at $788,600.

"In discussing the terms of a revised franchise with your Joint Committee, amendments were suggested covering proper sanitary supervision of the tunnels, the right of the city to place its fire and police wires within the same, and insuring prompt completion of the work, and the permanent possession of the franchise by a New York corporation. No objections were made to these amendments, and the tunnel company is quite willing to accept them; but another suggestion, that the tunnel company shall further indemnify the city against any claim for damages that may arise out of the closing of Thirty-second street between Seventh and Ninth avenues, cannot be assented to, for the reason that in agreeing to the price of $788,600 for the ground within the vacated portions of this street, the tunnel company is paying what is admitted to be the full fee simple value of the land, and which value largely results from such vacation. It is, therefore, incumbent on the city to meet such damages, if any, occasioned by the vacation, for which it may be held legally liable. It can hardly be claimed that the tunnel company should first pay full value for the land and in addition thereto pay damages which are an essential part of such value.

"One point more remains to be referred to, upon which the Pennsylvania Railroad Company desires that no misunderstanding shall exist, and that is the suggestion that, in the grant of the franchise, a condition shall be imposed regulating the rate of wages and the hours of the men employed upon the work. Counsel advise that this whole question has been so fully disposed of by the Court of Appeals of New York that it is unnecessary to do more than to say that the law is now settled and that the city cannot impose such conditions even in the building of its own subway. As has been explained to your committee, this is a question of no practical moment, for the reason that the work will be let to contractors, who will necessarily have to conform to the labor situation as it exists in New York. It would, therefore, be simply a pretense for the tunnel company or the Pennsylvania Railroad Company to agree to do something over which neither company will have any control. But, outside and beyond this, the city of New York is not justified in imposing any such condition. Its representatives are bound to protect its corporate interests in the agreement they may make with the tunnel company, but in going beyond this and attempting to impose a condition as to rates of wages or hours of labor to be paid by the tunnel company or its contractors, they would obviously exceed their proper powers and functions.

"As far as the Pennsylvania Railroad Company is concerned, its relations to labor, organized and unorganized, are of the most friendly character. It does not ask its employees whether they belong to one or the other class. It only asks for and insists upon faithful service. It has in its employment over 130,000 men; it pays them their wages promptly; it administers a fund which takes care of them in case of sickness or accident, and when their days of usefulness are over, it provides them with a pension which cares for them in their declining years. As far as it has anything to do with the labor question, it will in the future, as in the past, deal justly and generously with those either directly or indirectly in its service. But the managers of the Pennsylvania Railroad Company have a responsibility to the public as well as a duty to the shareholders, and they ought not and cannot consent to a provision in the franchise which either has no meaning, or, if it has any, would deprive them of that liberty of action in dealing with their employees which is essential to the maintenance of efficient service, to the proper conduct of their business and to the protection and safety of the public. Such a condition would be unreasonable, arbitrary, and utterly unwarranted; and if the franchise is coupled with any stipulation of that character, the public authorities imposing it must assume the responsibility of obstructing an enterprise which will not only furnish many millions of dollars of work to the laboring community of the city of New York, but will provide facilities absolutely essential to the comfort and convenience of its citizens and to the maintenance of its commercial position."

## Thickness of Fire on the Grate of a Locomotive.*

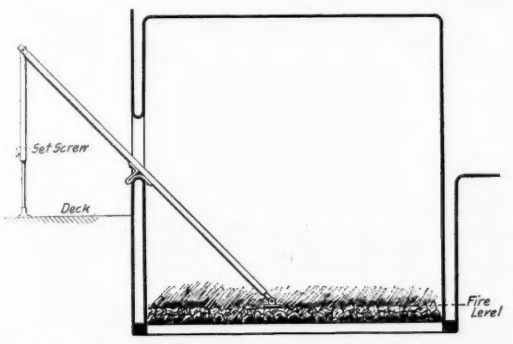
In a series of tests involving the experimental locomotive of Purdue University, and designed for the purpose of determining certain constants with reference to draft and smoke-box temperature, an attempt was made to secure accurate data concerning the thickness of the fire upon the grate. The measuring device used is shown in the engraving. It consists of a long arm made up of 1 in. pipe, which can be inserted into the door of the furnace. The pipe carries a lug which, resting on the lower edge of the door-opening, can be made to support the pipe, all as shown by the cut. The inner end of the pipe has connected with it a pivoted shoe presenting a surface about 3 in. sq., which, when adjusted, has contact with the surface of the fire. The outer end is connected with an adjustable standard by means of which

*Abstracted and adapted from a thesis entitled "A Study of Draft and Temperature Conditions in Relation to the Boiler Performance of a Locomotive;" a thesis submitted to the Faculty of Purdue University by Charles H. Fry, B. S., June, 1901.

the shoe on the inside can always be brought in contact with the coal upon the grate. Graduations on this standard serve to show the distance between the under surface of the shoe, and the upper surface of the grate, which is assumed to be the thickness of the fire.

It is to be noted that this device gives the thickness of the fire at a single point only, but as in all cases where tests were made, the fire was maintained at a very uniform thickness throughout the area of the grate, it is believed that the values obtained are fairly representative. In each case the test was commenced with a clean fire and generally was not prolonged for more than two or three hours. The fuel used was Indiana washed lump. The firing was done in the usual manner, no attempt being made to control its thickness in any way, the effort being to maintain good steaming conditions.

The results, both as to thickness of fire and as to other important facts affecting boiler performance, are given




**Method of Measuring Thickness of Fire Upon Grate of Locomotive.**

in the table. The data represent conditions for which the power developed varies from 300 to something over 500 h.p., the latter being near the maximum limit for the boiler under test. The data are not free from inconsistencies, but are interesting in the range of values presented. They show that the maximum thickness of fire observed was but little in excess of four inches, and that a range of between three and four inches is sufficiently wide to cover almost every condition observed. Locomotive men generally assume that thicknesses much greater than these are necessary; estimates frequently running to values as great as 10 and 12 in. While it is possible that such thicknesses may be realized in practice, they could not be maintained with satisfactory results under the conditions of the experiments herein described.

*Ten Observations of the Thickness of the Fire on a Locomotive Grate.*

| Thickness of fire, in. | Horse power developed by boiler. | Draft, inches of water. | Lbs. of coal per sq. ft. of grate surface per hr. | Equiv. evaporation per sq. ft. of heating surface per hr. | Equiv. evaporation per lb. of dry coal burned per hour. |
|---|---|---|---|---|---|
| 3.00 | 296 | 2.54 | 80.04 | 7.73 | 8.43 |
| 2.38 | 322 | 3.03 | 83.02 | 8.4 | 7.62 |
| 3.83 | 400 | 3.73 | 105.58 | 10.44 | 7.33 |
| 2.20 | 353 | 4.28 | 90.56 | 9.22 | 7.53 |
| 3.33 | 455 | 4.88 | 115.5 | 11.88 | 7.35 |
| 3.56 | .... | 6.33 | 152.11 | ..... | .... |
| 2.90 | 520 | 6.25 | 160.16 | 13.58 | 6.37 |
| 4.20 | 518 | 6.24 | 165.24 | 13.52 | 6.13 |
| 3.80 | 527 | 6.42 | 163.36 | 13.76 | 6.31 |
| 4.00 | 529 | 6.66 | 152.64 | 13.8 | 6.8 |

## TECHNICAL

### Manufacturing and Business.

The White Enamel Refrigerator Co., St. Paul, Minn., makers of the Bohn system of refrigerators, has closed its Chicago office.

Mr. H. M. Perry, who was employed by the Algoma Central & Hudson Bay Ry. Co., to build their new car shops, at Sault Ste. Marie, Ont., organize their car department and design their equipment, has completed his work and reopened his office in the Monadnock Block, Chicago, on Sept. 1, 1902. Mr. Wm. Apps, formerly of the Canadian Pacific Ry., has succeeded Mr. Perry as Master Car Builder.

R. C. Fraser, for several years with the *Railroad Gazette* and for the past three years Eastern Sales Agent of the Monarch Brake-Beam Co., has been appointed manager of the railroad department of the U. S. Metal & Mfg. Co., 25 Broad street, New York City. The company is selling agent for the Johnson hopper, flush, and refrigerator car doors; the Combination steel draft rigging and underframe; the U. S. steel truck, and the National adjustable journal bearing; and sole railroad agent for the Cliff & Guibert automatic hose reel.

The University of Illinois has taken advantage of the perfection of the 220-volt incandescent lamp and the recent revision of the National Electrical Code of the Fire Underwriters, permitting the use of 500-volt distribution within buildings, by installing a 440-volt plant for the lighting of the five new buildings at Champaign. Two-phase alternating current will be used and each phase will be treated as a single-phase circuit operated on the three wire system, the neutral wire being supplied with current from an auto-transformer. Although the 220-volt lamp is somewhat less efficient than the 110-volt lamp, the difference will be of very little moment, in this case, since the exhaust from the steam engine plant operating the generators is to be used in heating the buildings. The generating station contains two-belted two-phase generators, one of 50 K.W. and one of 75 K.W., operated at 440 volts, to which will shortly be added an engine-type, revolving field, 120-K.W. alternator, bought from the Westinghouse Electric & Mfg. Co.

### Iron and Steel.

A mortgage of $10,000,000 has been made by the Bethlehem Steel Co., of Pennsylvania, in favor of the Colonial Trust Co., of New York, to secure an issue of a similar amount of 20-year 5 per cent. gold bonds issued by the United States Shipbuilding Co., and bought by the New York Security & Trust Co. It is dated Aug. 20 and bears interest at 4 per cent.

### Steel Castings.

The greatest surprise of the year comes in the large number of steel foundries that have been projected since the beginning of 1902. At that time there were 73 establishments in the United States and Canada making steel castings, this number including those using the Tropenas and similar processes. We find that exactly 20 new concerns have been organized in this branch of the trade since then, which, as far as numbers are concerned, shows an increase of over 27 per cent. This is to all appearances an abnormal expansion, although it is a well-known fact that the demand for steel castings is constantly increasing. The malleable industry in the first six months of the year shows 10 new shops, building or proposed, an increase of 9 per cent.—*The Foundry.*

### Steel for Battleship "Connecticut."

Proposals for steel for use in building battleship "Connecticut" at the Navy Yard, Brooklyn, N. Y., will be received at the Navy Department until 12 o'clock noon, on Wednesday, Sept. 10. Specifications and all information may be obtained on application to the Bureau of Construction and Repair, Navy Department. Chas. H. Darling, Acting Secretary of the Navy.

### Midland Three-Cylinder Compound.

The new Midland Railway compound, three-cylinders, designed by Mr. S. W. Johnson, is running now and giving good results, hauling good loads at high speeds.

### Standard Details.

The June number of the Proceedings of the Pacific Coast Railway Club contains among other things some interesting answers to the question, "What steps have the leading railroads in the United States taken to introduce standard details for locomotives and cars?" The work done in this direction on the Southern Pacific is considerable, and shows the money saving in a properly applied system of standards. In one case 41 new patterns have displaced 592 old patterns, and in many instances the same standards for cars have been applied to locomotive tenders and other locomotive parts.

### Ten-Wheel Compounds for the Canadian Pacific.

In our issue of August 15th we published a photograph and description of a ten-wheel, two-cylinder compound built at the shops of the Canadian Pacific for that company. The American Locomotive Company have recently built at their Schenectady works three engines for the same company with quite similar proportions but with certain essential differences worthy of note. The total weight of engine and tender is 8,575 lbs. less than the Canadian Pacific build, while the total weight of the engine is 2,525 lbs. greater. The American Locomotive Company's engine has 22 in. and 35 in. x 26 in. cylinders with piston valves as against 22 in. and 33 in. x 26 in. cylinders and slide valves on the engine described. The fire-box heating surface is 19.36 sq. ft. greater on the Schenectady engine, and the location of the sand-box, bell and whistle is slightly changed. The air reservoirs are in the usual place and not under the tender, and the guides of the Schenectady engines are of the four-bar type instead of the alligator type.

### New Naval Dry Dock.

Bids have been asked by Rear Admiral Endicott, Chief of the Bureau of Yards and Docks, Navy Department, for the construction of a stone and granite dry dock for the new naval station at Charleston, S. C., the bids to be opened on Oct. 11 next. The dock proper and entrance will be of concrete with granite facing and coping with continuous waterproof courses of felt laid in asphalt, unless in the progress of the work it is found preferable to use piles under the entire dock. The dimensions of the dock are to be 643 ft. long and 144 ft. wide, with an entrance depth of 42 ft. The entire dock, including pumping plant and other apparatus, is to be $1,200,000, and the amount appropriated and available for the work under the specifications now to be issued is $850,000.

### Pneumatic Ballast Spreaders.

The Chicago, Burlington & Quincy is building four Jordan earth and ballast spreaders with pneumatic attachments at its Aurora shops. Three of these will be for the road's own use and the fourth is for H. H. McDuffee, Sole Agent, Chicago. The Burlington has had one of these spreaders in use already for about a year. The Pittsburgh & Lake Erie is also building one with pneumatic attachments, and the St. Louis, Iron Mountain & Southern one with hand gear attachments. The Grand Trunk has six of these machines, three of which are operated pneumatically, and three by hand gear.

### Troy Steel Company Reorganized.

The Troy Steel Products Company, a reorganization of the Troy Steel Company, on Breaker Island, N. Y., was incorporated Aug. 30 with a capital of $1,750,000. The directors are Everett D. Arnold, of Yonkers; William Francis Donovan, of St. Louis; J. Russell Clarke, George L. Olney and J. Hollis Gibson, of Brooklyn; Louis E. Freeman, of Orange, N. J., and Francis L. White, of Summit, N. J. Work was recently begun on rebuilding with the expectation of being ready Jan. 1.

### Sterlingworth Car Company.

The new plant of the Sterlingworth Car Co., which is being built in Eddystone, Pa., will have a main building about 300 x 600 ft. The plant will be equipped with all modern appliances, and it is planned to build about 30 steel cars a week.

### Second Track on the Chicago & North Western.

Probably the statement of the important increase of second track on the Chicago & North Western was obscured in our review of the annual report, by statements of more important facts. The company's main line from Chicago to the Missouri River at Council Bluffs (490 miles) is now a double-track road. The present double-track of the system amounts to 797 miles; namely, from Chicago to a point a little north of Milwaukee, from Chicago to a connection with the "Omaha" road at Elroy, Wis., and from Chicago to Council Bluffs.

### The Iron City Spring Co.

D. C. Noble, for some 20 years Secretary and Treasurer of the A. French Spring Co., now a part of the Railway Steel Spring Co., associated with a number of Pittsburgh capitalists, has formed the Iron City Spring Co., with $500,000 capital. The company was chartered under the laws of Pennsylvania some time ago, and the entire capital has been subscribed. The Fox plant of the Pressed Steel Car Co. at Fifty-third street, and the Allegheny Valley R. R., Pittsburgh, has been bought and arrangements are now being made to get the necessary machinery. It is expected to have the plant ready for operation about Jan. 1. The annual capacity will be between 12,000 and 15,000 tons of springs.

## THE SCRAP HEAP.

### Notes.

Passenger train No. 3 of the Northern Pacific was stopped by robbers near Sand Point, Idaho, on the night of August 25. The express car was blown open with dynamite, but it is said that the robbers failed to open the safe and went off without any booty.

On Saturday last the conductors and motormen of the Hudson Valley road, an electric line north of Albany, all struck, completely tying up the road. The press despatches say that the strike is due to an order by which the pay of the men has been reduced about one-third, or from $1.87 to $1.25 a day.

The capacity of even a four-track railroad has its limits, and we read that the New York Central is now putting in long side-tracks at three stations between Buffalo and Rochester, for the use of fast freight trains which run on the passenger tracks, and which, of course, must sometimes turn out for passenger trains.

According to St. Paul newspapers demurrage is to be systematically collected on freight cars at St. Paul and Minneapolis beginning Sept. 7, the Terminal Despatch Association having been revived. On cars containing grain the rate is to be $2 a day, which is twice the rate on other freight. A railroad officer tells the reporter that since July 1 the number of cars held by shippers for more than a reasonable length of time has been reduced 80 per cent.

A party of machinists from Indianapolis have secured the arrest of the President of the Union Pacific for false imprisonment, claiming that they were kept in a passenger car by an armed guard. The men were engaged at Indianapolis to work in the shops of the Union Pacific at Omaha and places farther west. They claim that they were misinformed as to the existence of a strike in the shops of the road, and that they were unreasonably deprived of their liberty after passing Council Bluffs.

### Traffic Notes.

The Illinois Central has bought two steamships, formerly belonging to the Southern Pacific, which will be used to start a regular line between New Orleans and Havana.

The Interstate Commerce Commission has begun suit in the Federal Court at Los Angeles, to enforce its order, issued last June, requiring the Southern Pacific and the Atchison to abolish the rule forbidding shippers of oranges and lemons to designate the route over which their shipments to the East shall be sent.

A Philadelphia paper learns that the number of passengers carried between New York and Philadelphia over the Reading road, in July, was double the number carried in the same month last year. This increase is attributed chiefly to the increase in the number of express trains and the adoption of the uniform one-hour interval between trains.

### Passes.

The propensity of some railroad officers to be very liberal with passes when politicians apply for them was recently referred to in these columns. In this connection, a New York passenger man says that since the restriction in exchange passes, which was adopted by the trunk lines at the beginning of this year, some politicians have gone so far as to obtain passes for railroad men, where the latter could not have got them directly. The Grand Trunk has caused renewed discussion of the exchange-pass agreement by inviting all of the members of the General Passenger Agents' Association to take a free ride over its lines to the annual meeting of the Association, which is to be held in Portland, Me., next month. According to a press despatch from Pittsburgh, Pa., Recorder Brown, of that city—the "Recorder" is, we believe, the Mayor—receives from 40 to 100 applications daily for railroad passes; and, from the tenor of the newspaper item, we judge that a good many of these applications are filled, by one railroad or another. Mr.

Brown says that the most persistent applicants are millionaires. Mr. Brown has had to do a good deal of his work at his residence, remote from his office, in order to evade the pass hunters.

### The St. Louis Fair—Transportation Exhibits.

The building devoted to transportation exhibits has the largest space of any on the grounds. It is to be rectangular 525 ft. by 1,500 ft. Locomotives, cars and all railroad exhibits will occupy a central position. There is no charge for space, and all arrangements regarding power, light, etc., are of the most liberal character. Blank applications for space will be sent on request. The date of the Exposition having been changed to 1904, there is abundant time for the preparation of exhibits. The Director of Works has written the following regarding the structure.

"The Transportation Exhibits Building is placed on the extreme northwest corner of the main picture of the Fair. It will be exceeded in size only by the Agricultural Building. The facades show an adaptation of the French Renaissance. On the east and west fronts are three arches which embrace more than half of the facade. Each of these arched openings will be 64 ft. wide and 52 ft. high. Through these archways 14 permanent railroad tracks will be laid from one end of the building to the other. The building will contain about four miles of standard gage railroad track, but two entire bents of the building are left free of rails and afford an exhibit space of 270,000, sq. ft."

### Disastrous Wreck in Alabama.

An excursion train of the Southern Railway was derailed near Berry, Ala., on the morning of Sept. 1, and 25 or more persons were killed, including 24 passengers, and the trainmaster of the Birmingham division of the road, who was on the engine. The engineman and fireman were fatally injured, as were some of the 80 or more passengers who were hurt. The passengers were all negroes, and the excursion filled 10 cars. The tender was the first vehicle to leave the track, and it, with the engine and five cars, was overturned.

### St. Louis Club Scholarship.

At the special meeting of the executive committee of the St. Louis Railway Club, held Aug. 20, 1902, called to pass upon the Purdue Scholarship which the club offered to sons of members, Mr. Henry P. Barnard, of East St. Louis, son of the ex-Superintendent of Terminals, Southern Railway, was selected for the three years course, which carries with it benefits amounting to more than $250 a year. Mr. Harry J. Hair, of Washington, Ind., and Mr. Herbert N. Patton, of St. Louis, were elected as first and second alternates. The candidate selected will have to qualify for admission to the University under the conditions regularly prescribed and in case of failure the next alternate will be given an opportunity to qualify.

The first of the fall meetings of the Club is to be held in the Administration building at the World's Fair. Addresses will be delivered by President Francis and Secretary Stevens, of the World's Fair, and a paper on "The Railway Station at Bombay, India," by Mr. T. S. Blish, will be read.

## LOCOMOTIVE BUILDING.

*The Southern* is rumored to be in the market for 50 locomotives.

*The Chicago, Milwaukee & St. Paul* is figuring on additional locomotives.

*The Wabash* has ordered 50 engines, including passenger, freight and switchers. The passenger engines will have wide fire-boxes; diameter of drivers, 83 in.; working steam pressure, 210 lbs.

*The Chicago, Rock Island & Pacific* is asking quotations on eight new locomotives. An officer writes that the specifications for the Brooks order reported in our issue of Aug. 15 have not yet been arranged.

*F. M. Hicks*, of the Hicks Locomotive & Car Works, has received orders during the past week for single, rebuilt locomotives, from the St. Louis & Gulf and Tennessee Central Railroads and the Alabama Consolidated Coal & Iron Co.

*The Grand Rapids & Indiana* has ordered two simple mogul engines from the Baldwin Locomotive Works for February, 1903, delivery. These engines will weigh 162,500 lbs., with 140,300 lbs. on the drivers; cylinders, 20 x 28 in.; 62 in. drivers, Belpaire wide boilers, with a working steam pressure of 205 lbs.; 364 wrought-iron tubes, 2 in. in diameter and 145 in. long; fire-box 106¾ in. long and 66 in. wide of steel; tank capacity 5,200 gallons of water and 20,000 lbs. of coal. The special equipment includes: Westinghouse air-brakes, Cook and Strong bell ringers, National-Hollow brake-beams, P. R. R. brake-shoes, Tower couplers, P. R. R. special headlights, Sellers injectors, United States Packing Company's piston and valve rod packings, Kunkle safety valves, Leach sanding devices, Michigan sight-feed lubricators, P. R. R. springs, Crosby steam gages, P. R. R. straight steam heat equipment and Latrobe driving, truck and tender wheel tires.

## CAR BUILDING.

*The Northern Pacific* is having 10 coaches built at the Pullman Works.

*The Mather Stock Car Co.* is having 30 freights built at the South Baltimore Car Works.

*The New York, New Haven & Hartford* is having 17 coaches built at the Pullman works.

*The Chicago & North Western* is reported to be preparing to build 400 freights at its own shops.

*The Chicago, Rock Island & Pacific* are again reported to be preparing to order a large number of freight cars.

*The St. Louis & San Francisco* has ordered 1,500 box cars from the American Car & Foundry Co., instead of 1,300, as reported in our issue of Aug. 29.

*The Pennsylvania* is having 650 freights built at Allegheny by the American Car & Foundry Co., for the lines west, and 281 freights built at the Cambria Steel Works.

*The Minneapolis, St. Paul & Sault Ste. Marie* order for 300 box cars, reported in our issue of Aug. 22, calls for wooden cars with wooden underframes. Capacity, 60,000 lbs.; weight, 36,000 lbs.; length, 35 ft. over end sills; width, 8 ft. 11 in., over sills; height, 8 ft., inside measurement. Special equipment includes steel axles, Common Sense bolsters, Damascus brake-beams, Congdon brake-shoes, Westinghouse brakes, Fulton brasses, Washburn couplers, Durham doors, McCord journal boxes and lids, and 33 in. A. C. & F. cast-iron wheels.

## BRIDGE BUILDING.

Bellefonte, Pa.—A new township bridge will be built over Spring Creek in College Township, to replace the structure that recently collapsed.

Clarion, Pa.—The Grand Jury has approved of the erection of a bridge over Paint Creek in Farmington Township.

Connellsville, Pa.—The new line to be built by the Wabash System into the coke region will cross the Monongahela River over a high bridge at the mouth of Brown's Run and near the proposed terminus of the Monongahela River Railroad, now being built jointly by the Pennsylvania and Pittsburgh & Lake Erie.

East Youngstown, Ohio.—The bridge to be built over the Pittsburgh & Lake Erie, the Baltimore & Ohio and the Mahoning Electric Railroad tracks will be approximately 700 ft. long, and built principally from old material owned by the Pittsburgh & Lake Erie.

Guelph, Ont.—T. J. Colwill has made plans for two concrete abutments for a steel bridge 130 ft. long over the Grand River, on which it is said bids will soon be wanted.

Harrisburg, Pa.—Proposals for rebuilding county bridges, destroyed by fire and flood during the past year, will be opened at noon Sept. 23 by the Board of Public Grounds and Buildings on Capitol Hill. Bids must be placed in separate envelopes, endorsed on the outside with the name and location of the bridge, and the name of the bidder. The Board is composed of Gov. W. A. Stone, Auditor General E. B. Hardenberg, and State Treasurer Frank G. Harris. T. L. Eyre is superintendent. The bridges for which proposals are invited are located as follows: Over Sugar Creek at East Troy, Bradford County; Towanda Creek at Masontown, Bradford County; Wyalusing Creek at Wyalusing, Bradford County; Lycoming Creek, near Field's Station, Lycoming County; Loyalsock Creek, near Picture Rocks, Lycoming County; Lehigh River at Bowmanstown, Carbon County; Lehigh River at White Haven, Luzerne County; Lackawanna River at Old Forge, Lackawanna County; Tionesta Creek, nine miles from Tionesta, Forest County; Susquehanna River at Tunkhannock, Wyoming County; Tunkhannock Creek at Dixon, Wyoming County; Tuscarora Creek near Port Royal, Juniata County; west branch of Susquehanna River near Curwensville; Red Bank Creek at Brookville, Jefferson County; Elk Creek in Sullivan County; Lackawaxen Creek, near Honesdale, Wayne County; Lackawaxen Creek, two miles from Honesdale, Wayne County; Schuylkill River, 5½ miles north of Reading, Berks County. The total cost will be about $475,000.

Hillsboro, Texas.—An election is shortly to be held to vote on the issuing of $40,000 of bonds for rebuilding bridges and repairing roads damaged by recent floods.

Hincks (County of Ottawa), P. Q.—The Township of Hincks is considering building a $9,000 bridge over Gatineau River at Lake St. Mary.

Kansas City, Mo.—The contract for the substructure for the new bridge over the Missouri River at Kansas City has been let, and the contract for the superstructure will be let in about two or three weeks. The draw in this bridge will be probably the heaviest in the country, weighing over 6,000,000 lbs.

Lancaster, Pa.—The new Lancaster & Rohrerstown Railway will build bridges over Little Conestoga Creek and an overhead crossing over the Pennsylvania Railroad at Rohrerstown.

Le Roy, N. Y.—A bridge is proposed over Oatka Creek at Main street. Nothing has been definitely decided. A. L. Cosway, Highway Commissioner.

Lewistown, Pa.—The Grand Jury has approved of the erection of a bridge over the Juniata River in Granville Township.

O'Neill, Neb.—Bids are wanted by the County Clerk until Sept. 15 for a bridge over Elkhorn River. E. S. Gilmour, Clerk.

Pasadena, Cal.—City Engineer T. D. Allin has recently made estimates for the proposed Boulevard bridge at Madeline Drive, steel bridge with 20-ft. roadway and 6-ft. walk, $10,000; 30-ft. roadway, 6-ft. walk, $16,000; 40-ft. roadway, 6-ft. walk, $25,000.

Philadelphia, Pa.—Bids are wanted until Sept. 20 by the Board of Public Works for the new bridge in Torresdale.

St. Louis, Mo.—The County Court has ordered the Commissioner of Roads and Bridges to build a bridge near Fenton; also one south of Ballwin, and another near Florissant.

St. Paul, Minn.—The Board of Aldermen has ordered the City Engineer to make plans for the extension of the Third street bridge to Maria avenue. The city has appropriated $55,000 for this work, the total cost of which will be $125,000.

Sioux City, Iowa.—Bids are wanted Sept. 9 by Chas. Kloster, City Clerk, for two steel bridges, each to cost $1,416.

Sydney, N. S. W.—Bids are wanted by the Commissioner of Roads and Bridges until Oct. 20, for a bascule bridge over the Murrumbidge River.

Terre Haute, Ind.—Bids are wanted by the County Auditor of Vigo County in Terre Haute until Sept. 18 for building two bridges on the county line.

Bids are wanted by the County Auditor on Sept. 20 for building four other bridges.

Victoria, B. C.—Bids are wanted Oct. 13 for building the Point Ellice bridge. Plans can be had from C. M. Topp, City Engineer.

Washington, Ind.—Both Knox and Daviess Counties have voted to build a bridge over White River on the county line. Thos. Harris, County Clerk.

Watsontown, Pa.—S. B. Haupt, General Manager of the Susquehanna, Bloomsburg & Berwick R. R., can give information as to the bridges required on this road.

West Chester, Pa.—The Grand Jury has approved the report of viewers on bridges over French Creek in Warwick Township; between Chester and Lancaster Counties, and over Brandywine Creek at Lenape.

York, Pa.—The Grand Jury has approved of the construction of the following county bridges: Over Little Conewago Creek in Manchester Township; over Beaver Creek in Warrington Township; over Muddy Creek, between Farm and East Hopewell Townships, and over the creek at Mt. Wolf.

### Other Structures.

Atlanta, Ga.—The Southern has recently bought additional parcels of land and is now getting ready to build new freight and passenger stations.

Birmingham, Ala.—The Valley Iron Company, with a capital stock of $1,000,000, was formally organized at Birmingham Aug. 27. Its property includes nearly 14,000 acres of mineral lands in Dale County, Ga., and De Kalb County, Ala. A blast furnace will be built, coal mines opened, and coke ovens built. The directors are: Archer Brown, New York; H. A. Masting, Ironton, Ohio; J. G. Battelle, Columbus, Ohio; J. A. Andrews, Newport, Ky.; James Boweron, C. B. McCormick, Erskine Ramsay, Charles A. Stillman, Birmingham; James L. Gaines, Nashville. Officers are as follows: J. G. Battelle, President; Erskine Ramsay, Vice-President; J. E. Steins, Wheeling, W. Va., Secretary-Treasurer; Charles E. Boweron, General Superintendent.

Buffalo, N. Y.—The Buffalo, Rochester & Pittsburgh, according to report, is to spend about $100,000 on building a new ore dock at the foot of Michigan street. A Hulett unloading and conveying machine will be installed.

Plans for the new plant to be built on Fillmore avenue for the Buffalo Foundry Co. have been made.

Chattanooga, Tenn.—The Central of Georgia is considering the advisability of moving its Chattanooga Division shops from Chattanooga to either Rome or Cedartown, but we are told nothing definite has been decided upon.

Frankfort, Ky.—The Louisville & Nashville, in connection with the Frankfort & Cincinnati Co., will build a $25,000 freight house in Frankfort.

Fremont, Neb.—The Elkhorn and Union Pacific roads are preparing to build a new station in Fremont.

New Decatur, Ala.—The Louisville & Nashville has let a contract to Cook & Laurie, of Montgomery, for building its proposed shops in New Decatur, the main building of which will be 300 x 700 ft.

Parsons, Kan.—The Missouri, Kansas & Texas has recently begun work on some additional buildings at its shops in Parsons. The new brass foundry will be a brick structure 60 x 71 ft., and the boiler house will be 47 x 67 ft., also of brick.

Paterson, N. J.—The Jersey City, Hoboken & Paterson Street Ry. has let a contract to the Michael Lynch Building Co. for its new car barn at Paterson, the price being $100,400.

Scranton, Pa.—The Lackawanna R. R. has just let a contract for grading preparatory to building new car shops here. In addition to the shops there will be a yard about a mile long and wide enough for 18 tracks.

Toledo, Ohio.—The Toledo Railway & Terminal Co. has let a contract to A. Bentley & Sons for its new passenger and freight station on Cherry street. The price is about $300,000.

Vancouver, B. C.—A. G. Newton is reported interested in a steel works to be established on Vancouver Island.

West Milwaukee, Wis.—Plans have been made by the Chicago, Milwaukee & St. Paul for improvements to its shops at West Milwaukee, to consist of a new powerhouse, and an addition to the machine shop. The powerhouse will be 97 x 100 ft., of brick and steel construction, with concrete and pile foundations, and will furnish power for the entire shop. The equipment will consist of four boilers, of 300 h.-p. each, an air compressor of 1,200 cu. ft. capacity, 14 x 26 x 36 in.; a Westinghouse engine, of 160 h.-p., direct connected to a 100-kilowatt generator; two 330-h.-p. Corliss engines, each connected to 200-kilowatt generators; a 1,000-gallon fire pump, 600-gallon washout pump, together with Cochrane feed water heater and vacuum oil separators. The present machine shop is 420 x 154 ft., and the extension will be 112 ft. long. It will be two stories high, of iron construction, faced with brick, and the machines in the entire building will be rearranged with such new ones as are necessary.

Winnipeg, Man.—The Winnipeg Elevator Co., Ltd., proposes to build 20 new elevators in Manitoba. T. T. W. Bready is President; John Love, Vice-President, and R. J. Houden, Secretary.

## MEETINGS AND ANNOUNCEMENTS.

*(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)*

### St. Louis Railway Club.

At the meeting on Aug. 8, the papers were: "Moral Discipline," by J. B. Josslyn, Manager K. & I. B. & R. R. Co.; also "The Proper Method of Counting Cars Handled Over Terminals in Figuring Cost of Handling per Car," by R. V. Miller, Trainmaster, Frisco System.

### American Society of Civil Engineers.

The first regular meeting of the season of 1902-'03 was held at the Society House at 8.30 p.m. on Wednesday, Sept. 3. A paper by R. C. McCalla entitled "Improvement on the Black Warrior, Warrior and Tombigbee Rivers in Alabama," was presented for discussion. This paper was printed in the "Proceedings" for April, 1902.

### Central Railway Club.

The next regular meeting of the club will be held at the Hotel Iroquois, Buffalo, N. Y., on Friday, September 12, 1902, at 2 p.m., the Executive Committee meeting at the same place at 1 p.m. The discussion of the report of the committee on High-Speed Brakes, which constituted so important and interesting a feature of the May meeting, will be continued.

### Canadian Railway Club.

The next regular meeting of the Club will be held at the Windsor Hotel, Montreal, at 8 o'clock p.m., on Tuesday, Sept. 9, 1902. There will be a continuation of the discussion on the Manufacture of Iron and Steel. A paper will be read by Mr. W. H. Rosevear, the General Car Accountant of the Grand Trunk Railway, on Per Diem Rules. There will also be a report from the committee on the revision of the Master Car Builders' Rules of Interchange.

### Western Society of Engineers.

The August number of the Journal of Western Society of Engineers contains a paper on the "National Bureau

of Standards," by Professor S. W. Stratton, Director of the Bureau, Washington, D. C.; also a discussion on the "Metric System of Weights and Measures," which was held on June 18; a paper entitled "The American Engineer in England," by Wm. G. Sloan, describes the work of building the Manchester plant of the British Westinghouse Electric & Mfg. Co. at Trafford Park.

**Northwest Railway Club.**

The next regular meeting of the Northwest Railway Club will be held at the West Hotel, Minneapolis, Tuesday evening, Sept. 9. Mr. F. B. Farmer will present a report relative to the portion of the Interstate Commerce Commission's annual report bearing on Defects to Railroad Equipment, as reported by their inspectors. The papers read at the May meeting, viz., "The Future Engineer" and "Train Lighting Tests," will be open for discussion.

A discussion on the "Best Form of Discipline for Engine and Train Men" will be opened by a series of short papers presented by Mr. M. Sweeney, General Supt. M. & St. L.; Mr. J. C. Goodman, Mechanical Inspector, N. P.; Mr. O. B. Johnson, Conductor, C. G. W.; Mr. S. Shepard, Master Mechanic, M., St. P. & S. S. M.

**International Association of Municipal Electricians.**

The Seventh Annual Convention will be held in Richmond, Va., Oct. 7, 8, 9. The papers to be presented are as follows: "Municipal Inspection and Control," Walter M. Petty, Sup't Fire Telegraph, Rutherford, N. J.; "Relation of Electrical Interests to Other Branches of the Municipality," Capt. Wm. Brophy, Boston, Mass.; "Classifying of Records of Electrical Departments and Standard Specifications for Supplies and Contracts," Edw. F. Schurig, City Electrician, Omaha, Neb.; "Report of Committee on Rules for Electrical Inspection and Control, especially with reference to the occupancy of Streets," Morris W. Mead, Sup't Bureau of Electricity, Pittsburgh, Pa.; "The Telephone service in connection with Fire and Police Signal Systems," Jerry Murphy, Sup't Police Telegraph, Cleveland, Ohio; "Electrical Government," A. S. Hatch, Ass't Sup't Public Lighting Commission, Detroit, Mich.; "Joint Use of Conduits," Chas. F. Hopewell, City Electrician, Cambridge, Mass. Mr. Hopewell will also give his "Illustrated Lecture of Fire and Police Telegraph." Frank P. Foster, Secretary, Corning, N. Y.

## PERSONAL.

—Mr. C. P. Olson, Superintendent of Bridges of the Burlington & Missouri River in Nebraska, with headquarters at Lincoln, Neb., was drowned in the river at Burlington, Iowa, Aug. 25.

—Mr. R. W. Billingsley, whose appointment as Superintendent of the Pittsburgh, Lisbon & Western was announced recently, died Friday, August 27, aged 22 years. Mr. Billingsley was a son of the President of this company, Mr. N. B. Billingsley.

—Mr. Gifford Pinchot, Chief Forester of the Department of Agriculture at Washington, sailed last week from New York for the Philippine Islands, where he will make an investigation, at the request of the War Department, of the timber resources of the islands.

—Mr. W. H. Wright, who becomes Superintendent of the Second District of the Atlantic Coast Line (Plant System Division), is a native of Georgia, having been born at Savannah in 1866. His railroad service dates from 1880, when he began as a messenger boy on the old Atlantic & Gulf. He was subsequently flagman, conductor in freight service, yardmaster, master of trains and Division Superintendent of the First Division. Mr. Wright assumed his new duties the first of this month.

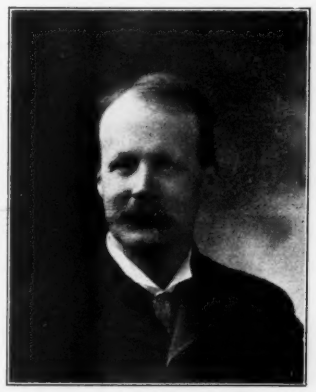
—Mr. E. W. Moore, Superintendent of the St. Louis Division of the Mobile & Ohio, was born at Keokuk, Iowa, in 1862. He entered railroad service on the Keokuk & Des Moines Valley as a brakeman in 1877. From there he went to the Cairo & St. Louis, a narrow gage road, which was changed to standard gage by the Mobile & Ohio in 1866. He served in all branches of train service from freight brakeman to passenger conductor from 1878 to 1890, and was promoted to Trainmaster of the St. Louis Division Oct. 1, 1890, from which position he has recently been appointed to the Superintendency of the St. Louis Division of the Mobile & Ohio.

—Mr. James E. Price, who was recently appointed General Superintendent of the Intercolonial, was born at Petitcodiac, New Brunswick, Oct. 18, 1854, and entered railroad service in 1867 as a telegraph operator for this company. In 1873 he became train despatcher at Moncton, and three years later Assistant Superintendent of the Moncton & Campbellton Division. In 1879 he went to Campbellton as train despatcher, where he remained until 1881, when he was appointed District Superintendent of the Moncton & Ste. Flavie District. From 1892 to 1898 he held a similar position on the Halifax & St. John District, and in 1898 he became General Superintendent. In the fall of 1901 he returned to the Moncton & Ste. Flavie District as Superintendent, receiving his recent promotion on Aug. 15, last. His entire railroad service has been with the Intercolonial Railway.

—Mr. A. O. Cunningham, Bridge Engineer of the Wabash and a member of the Am. Soc. C. E., was born at Rangoon, British Burmah, in 1866. After receiving his education in England he came to America at the age of 17 years and engaged in teaching school. Three years later he entered the employ of the Northern Pacific as a rodman. He afterwards entered the University of Minnesota, graduating as Bachelor of Civil Engineering. He then became a draftsman for the Gillette, Herzog Manufacturing Company of Minneapolis. In 1898 went with the Pittsburgh Reduction Company. The same year he formed the Pennsylvania Engineering Company at Pittsburgh, a concern which does strictly an engineering business. In 1899 he went with the American Bridge Company as Engineer for the Cleveland Contracting office, and six months later was made Contracting Manager at Cleveland. Mr. Cunningham resigned from this position in August last, to go to the Wabash.

—Mr. Albert A. Sharp, who has recently resigned as Superintendent of the Memphis Division of the Yazoo & Mississippi Valley, has been in railroad service since 1865, when he became a brakeman on the Western & Atlantic. He was at one time a conductor on the Edgeville & Kentucky and the Evansville, Henderson & Nashville railroads. From December, 1869, to late in the fall of 1882 he was consecutively conductor, general agent, Master of Transportation and General Freight and Passenger Agent of the Macon & Brunswick. For about two years he was Superintendent of Construction, and from March, 1885, to June, 1886, he was in the passenger department of the Louisville, New Orleans & Texas. For three years he was Superintendent of Transportation of that road, and in November, 1889, he was appointed Superintendent of the New Orleans Division of the same road. In May, 1890, he was appointed Superintendent of the Memphis and Riverside Divisions, and in September, 1892, the Vicksburg Division was added to his charge. These divisions are now known as the Yazoo & Mississippi Valley road. Mr. Sharp resigns to take charge of a plantation to which the Illinois Central is about to build a branch.

—We printed last week, page 681, a personal paragraph telling of the killing of Mr. Augustus Torrey, Chief Engineer of the Michigan Central, and giving a short account of his career and some estimate of his work and character. At that time the photograph from which this engraving is made had not been received, but we feel sure that many of our readers will be interested to see his genial, shrewd and highly intelligent countenance. Those who did not know much of Mr. Torrey or his work will understand what we said about him last week when they look at the picture printed with this note. There is little to add to our former paragraph. We learn from Mr. W. S. Kinnear, who succeeds Mr. Torrey as Chief Engineer, that Mr. Torrey was a graduate of the University of Vermont, a fact which we did not know when writing last week.



## ELECTIONS AND APPOINTMENTS.

*Atchison, Topeka & Santa Fe.*—L. M. Jones has been appointed Assistant Superintendent of Telegraph, with headquarters at Topeka, Kan.

*Baltimore & Ohio.*—W. S. Haines, Superintendent of Motive Power, with headquarters at Pittsburgh, Pa., has resigned, effective Sept. 1.

E. Kennerdell, heretofore General Foreman at Cleveland, Ohio, has been appointed Master Mechanic, with headquarters at Lorain, Ohio, succeeding J. A. Graham, resigned.

A. Kearney, heretofore Superintendent of Motive Power of the Philadelphia, Wilmington & Baltimore, has been appointed Superintendent of Motive Power of the B. & O., succeeding Mr. Haines.

*Burlington & Missouri River in Nebraska.*—F. J. Kraemer has been appointed Master Mechanic of the Wyoming Division—Newcastle East, with headquarters at Alliance, Neb., succeeding J. P. Reardon, assigned to other duties. A. B. Pirie becomes Master Mechanic of the Southern Division at Wymore, Neb., succeeding Mr. Kraemer, and W. F. Ackerman succeeds Mr. Pirie as Master Mechanic in charge of Havelock Shops. Chas. S. Bricker has been appointed Piecework Inspector, succeeding Mr. Ackerman, effective Sept. 1.

*Chicago & North Western.*—C. T. Dike has been appointed Division Engineer, with headquarters at Boone, Iowa.

*Chicago, Rock Island & Pacific.*—C. G. Delo has been appointed Principal Assistant Engineer of the Eastern District, with headquarters at Chicago, and Garrett Davis has been appointed Principal Assistant Engineer of the Northern District at Cedar Rapids, Iowa.

*Cincinnati, Indianapolis & Western.*—The following new Directors have been elected: M. D. Woodford, Henry F. Shoemaker, W. A. Read, Gordon McDonald, C. G. Waldo, John S. Lazarus, W. C. Shoemaker, F. C. Roby and George R. Balch.

*Cleveland, Cincinnati, Chicago & St. Louis.*—H. F. Houghton has been appointed Assistant General Superintendent. C. A. Paquette has been appointed Superintendent of the Chicago & White Water Divisions, with headquarters at Indianapolis, Ind., succeeding Mr. Houghton.

*Fort Smith & Western.*—A. C. Dustin has been elected President, succeeding the late Mr. Hayden. G. L. Hazleton succeeds Mr. Dustin as Treasurer.

*Illinois Central.*—D. Rose has been appointed Assistant to Second Vice-President J. T. Harahan.

*Michigan Central.*—W. S. Kinnear, heretofore Assistant Division Superintendent, has been appointed Chief Engineer, succeeding A. Torrey, deceased.

*New York Central & Hudson River.*—Howard L. Ingersoll has been transferred to the Middle Division as Resident Engineer during Mr. Tucker's illness, and Wm. T. Dorrance has been appointed Acting Resident Engineer of the Eastern Division.

*Philadelphia, Wilmington & Baltimore.*—A. Kearney, Superintendent of Motive Power, with headquarters at Philadelphia, Pa., has resigned. (See Baltimore & Ohio.)

*St. Louis, Kansas City & Colorado.*—H. Morris, Auditor, with headquarters at St. Louis, Mo., has resigned, and the office has been abolished.

*St. Louis Southwestern.*—J. P. Park been appointed General Freight Agent. T. C. Frew succeeds Mr. Park as Assistant General Freight Agent.

*Southern Kansas of Texas.*—H. Davis has been appointed Auditor, with headquarters at Amarillo, Texas, succeeding A. L. Conrad, resigned.

*Wisconsin Central.*—B. D. Lockwood has been appointed Mechanical Engineer.

## RAILROAD CONSTRUCTION.

### New Incorporations, Surveys, Etc.

ARKANSAS & CHOCTAW (ST. LOUIS & SAN FRANCISCO).—An officer writes that arrangements are already completed to finish the line between Hope, Ark., and Ardmore, Ind. T., without unnecessary delay. The road is now in operation from Ashdown, Ark., to Soper, 99 miles, and it is hoped that further sections will be placed in operation as rapidly as conditions will warrant. The proposed extension totals about 225 miles. (Aug. 1, p. 615.)

ARKANSAS CITY-PENDLETON.—A mass meeting of citizens has been held at Arkansas City in Desha County, Ark., to urge the building of a railroad between the points named. Pendleton is on the Arkansas River about 30 miles from Arkansas City.

ASHLAND & WOOSTER.—An officer is quoted as saying that an extension will be built from Ashland, Ohio, north through Savannah to New London, a distance of 17½ miles, and surveys for this extension made already.

ATCHISON, TOPEKA & SANTA FE.—Order is reported placed for 100 miles of 85-lb. rails to replace the 60-lb. rails now in use between Temple and McGregor, and between Fort Worth and Beaumont, Texas.

BARCLAY.—Surveys are reported for the proposed extension of this line from its present terminus to a connection with the Northern Central, crossing Sullivan County, Pa., about eight miles from Canton. The line is at present in operation between Towanda, Pa., and a point known as Foot of Plane, 14 miles, and the proposed extension will be about 15 miles further.

BAY OF QUINTE.—An officer is quoted as saying that the survey of the new line to Bannockburn, Ont., is now completed and that building will begin at once. The company also proposes to run a line to North Bay to connect with the Temiskaming. Further plans include the erection of smelters at Kingston, Ont., for nickel ore, and the removal of the present car shops from Deseronto to Napanee, where very much enlarged shops will be built.

BRINKLEY & MARIANNA.—Organization of a company to build between these two points in Arkansas is reported. The projected distance is about 25 miles. John M. Daggett, of Marianna, is interested.

BROOKFIELD-CUIVRE JUNCTION (ELECTRIC).—A company has been organized in Missouri to build an electric road near these two points, within the State, about 175 miles apart. Surveys are reported completed for a portion of the distance. Howard Ellis, of New Florence, Mo.; R. C. Clark, of Fayette, and others, are interested.

BURNSVILLE & EASTERN (LITTLE KANAWHA).—The incorporators of this company, which proposes to build a connection between the western terminus of the West Virginia Central & Pittsburgh and the Little Kanawha, met for organization on Aug. 29, and J. T. Blair was elected President; D. I. Roberts, Vice-President, and H. J. Cook, Secretary. Mr. Roberts has recently been put in charge of the operation of the Little Kanawha. The officers of the Parkersburg Bridge & Terminal Co., which is to have control of the bridge across the Ohio River at this point and the terminals, was organized at the same time, with the same list of officers. (Aug. 8, p. 631.)

CALIFORNIA ROADS (ELECTRIC).—Application has been made by W. J. Rogers, of San Jose, for a franchise to build an electric road through Santa Cruz County. Bids for this franchise will be received by H. H. Miller, County Clerk, until Sept. 10.

CANADIAN NORTHERN.—Work has begun clearing up the old Hudson Bay Ry. grade and the Canadian Northern, who own the charter, will, it is said, build the line at once to Oak Point, Lake Manitoba, and ultimately further north.

CANADIAN YUKON WESTERN.—Notice of an application to the Dominion Parliament has been made by Chas. Archer, of Dawson City, for an act incorporating a company with the above title, empowered to build from Dawson west to the boundary line, and along the northwest shore of the Yukon so as to connect with any other railroad on the American side of the boundary. Powers to build a number of bridges, etc., are also asked.

CARLISH-DEEPWATER (WEST VIRGINIA).—Surveys are reported for a railroad between these points, 19 miles distant, in the interest of the Stuart Colliery Co., of Scarbro, W. Va., and grading is in progress on a portion of the distance. J. H. Johns, of Carlish, W. Va., is Chief Engineer.

CAROLINA & TENNESSEE SOUTHERN (SOUTHERN).—This company was chartered in North Carolina Aug. 29 to build from Franklin, in Macon County, down the valley of the Little Tennessee, to the point where it enters Tennessee, a distance of 60 miles. The directors are A. B. Andrews, W. W. Finley, Fairfax Harrison and others connected with the Southern.

CENTRAL NEW ENGLAND.—In regard to reports that grades were to be cut down, curves removed, etc., over the entire line, an officer writes that the changes outlined have never been considered by the company, and that the cost would be out of all proportion to the betterments resulting.

CHARLESTOWN, BERRYVILLE & WINCHESTER ELECTRIC.—This company was organized in Charlestown, W. Va., on Aug. 28, with the intention of building an electric line between the points named in West Virginia, about 22 miles distant from each other. The proposed route would parallel the Norfolk & Western between Charlestown and Berryville. Geo. Eyster, of Charlestown, W. Va., was elected President, and A. Moore, Jr., of Berryville, Vice-President.

CHICAGO GREAT WESTERN.—It is said that work will begin in a few weeks on changes to be made in the South Des Moines yard, which is to be converted from a level to a gravity yard, with a slope from west to east. A number of additional tracks will also be laid.

COLUMBUS, EUFAULA & GULF.—New announcements were made Aug. 28 that arrangements were completed to build this projected line from Columbus, Ga., to St. Andrews Bay, Fla., by way of Eufaula, Ala., a distance of 200 miles. Ground was broken last June. It is said that building will be recommenced some time during September. W. H. Hawkins is President. (June 13, p. 453.)

CUMBERLAND VALLEY.—Surveys are reported completed for the projected new line 10 miles long up the valley of Brush Creek, Ky., passing through coal lands. There has been some difficulty in securing rights of way and an alternate route up the valley of Poplar Creek is said to have been considered.

DENVER, NORTHWESTERN & PACIFIC.—At a special meeting of the stockholders held Aug. 30, it was voted to issue $22,000,000 50-year 4 per cent. first mortgage bonds, and contract with the Colorado-Utah Construction Co. was ratified to build the road. It was specified that work was to begin Sept. 1. (Aug. 29, p. 681.)

DES MOINES TERMINAL.—Purchase of land for terminal facilities are reported in East Des Moines, and certain rights of way have already been purchased from the Chicago Great Western crossing east and north to Sunnyside, where condemnation proceedings will be necessary. The company has bought all of each lot across which the terminal will run instead of merely right of way 50 ft. to

100 ft. wide. It was incorporated last June and obtained road privileges from the Legislature. F. M. Hubbell, of Des Moines, is President. (June 27, p. 520.)

Detroit, Lenox, Sanilac, Center & Bay City.—Fred. E. Montney, of Yale, Mich., and G. Lovejoy, of Mt. Clemens, Mich., are reported interested in building a railroad between the points named, a distance of about 146 miles. A majority of the right of way is said to have been secured. It is intended to build first a steam road, and after its completion to equip it with electricity.

Fredericksburg, Culpeper & Rappahannock.—Surveys are reported in progress for this projected line from Fredericksburg through Culpeper and Sperryville to Washington, Va., a distance of about 55 miles. The exact route has not yet been determined. (June 13, p. 454.)

Gulf, Colorado & Santa Fe (Atchison, Topeka & Santa Fe).—An officer writes that this line from Rogan to San Augustine, Texas, 58 miles, will be completed in September. The work is being done by the Old Colony Contracting Co., of Houston. The Center extension of the line continues in a general northerly direction from San Augustine to Center, in Shelby County, Texas, 21 miles distant, and is under contract to L. J. Smith, of Center. C. F. W. Felt, with office at Galveston, Texas, is Chief Engineer of the Gulf, Colorado & Santa Fe.

Guthrie, Shawnee & Coalgate.—A territorial charter was granted this company in Oklahoma Aug. 26, with $1,000,000 capital, to build from Guthrie west to Beaver, a distance of about 150 miles. The incorporators include ex-Governor Barnes and others, of Oklahoma Territory.

Halifax & Southwestern.—Contract is said to have been let to Henry Sorette to build one of the proposed branches of this projected line in Nova Scotia. Contract was let last year to Mackenzie & Mann to build the main line between Halifax and Yarmouth, N. S. The contract let Aug. 26 is for a branch from New Germany to Caledonia, 150 miles northeast. It is said that 2,500 tons of rails have been ordered for October delivery in Bridgewater.

Illinois Central.—Work is reported begun on the extension of the Belzona branch of the Yazoo & Mississippi Valley from Belzona to Yazoo City, Miss., about 25 miles. The new line will provide a direct route between Yazoo City and Memphis by way of Lake Cormorant and will open up a timber and farming country now without railroad facilities. (June 20, p. 486.)

It is said that another branch line will also be built by the Yazoo & Mississippi Valley and will run from Vaughan's Station to Ebenezer, Haywood and Tchula, Miss., a distance of about 32 miles.

Indianapolis, Lebanon & Frankfort Traction.—Work is reported in progress on the grade of this projected electric line, which is to run between the points named, a distance of about 47 miles.

Indian Territory Roads.—A movement is on foot to build a railroad from Chickasha to Shawnee by way of Norman, a distance of about 90 miles. The interest is said to be local.

Joliet & Western.—An officer is quoted as saying that an extension will be built east from Joliet, Ill., to Blue Island, where a connection will be made with the Illinois Central, and that a line will also be built in a southwesterly direction to Morris. Each of these lines will be about 22 miles long.

Kansas City, Beatrice & Western.—This company filed articles of incorporation in Nebraska May 10, and according to most recent advices, the projected line will be about 230 miles long, from Virginia to Atkinson, Neb., passing through Beatrice and Central City. It is said surveys have been made for 143 miles of the distance, and that 23 miles between Atkinson and Butte have been graded. J. E. Smith, of Beatrice, Neb., is President. (Aug. 8, p. 632.)

Knoxville, La Follette & Jellico.—In addition to the contract let originally to Mason, Hoge & Co., of St. Louis, and to Walton & Co., of Roanoke, Va., contract has been let to Edington, Groner & Griffiths to build the yards and terminal in the city of Knoxville, and also 12 miles additional of the road, a total of about 15 miles. This completes the work for which contract is likely to be let at the present time. John B. Newton, General Manager of the Atlanta, Knoxville & Northern, is President.

Long Island.—An order for 5,500 tons of 100-lb. rails is reported placed. The rails will be used in relaying the main line between Long Island City and Jamaica, and the Montauk Division between Valley Stream and Babylon. The Montauk Division between Valley Stream and Long Island City was relaid with 100-lb. rails last spring.

Ludlow & Southern.—Work is reported in progress on this new line from Ludlow, on the line of the Santa Fe Pacific to the mines of the Bagdad Mining & Smelting Co., and it is said that the grade will be ready for rails as soon as the latter can be furnished by the Santa Fe. E. H. Stagg and others are directors. (Aug. 15, p. 650.)

Minneapolis, St. Paul & Sault Ste. Marie.—Application is to be made to the next session of the Provincial Parliament for reincorporation, to include all the privileges and powers granted under previous acts of incorporation, and to provide for the projected building of a line from Gravenhurst to Sault Ste. Marie by way of the French River, a distance of about 225 miles.

Moravia-New Castle.—An officer of the Wabash denies that his company is interested in this projected line for which surveys have been made, following the route of the old Erie Canal along the banks of the Beaver River north from Moravia. (Aug. 22, p. 664.)

Nashville & Mississippi Delta.—At a meeting of the directors Aug. 26 it was voted to issue $400,000 bonds, with the proceeds of which the expenses of the projected line will be met. The line will run from Okolona, Miss., across Chickasaw County to the Calhoun County line, a distance of about 30 miles. The Mobile & Ohio is reported to be interested. J. W. Buchanan, of Memphis, Tenn., is President. (Aug. 15, p. 650.)

Norfolk & Southern.—Work is reported in progress on an extension of the Virginia Beach Division from Virginia Beach to Cape Henry, Va., a distance of six miles in a northerly direction. The line is said to be graded and ready for track laying.

North Carolina Roads.—Work is reported in progress on a logging road five miles long which is being built by the Murray Lumber Co., from a connection with the Southern near Old Fort, N. C.

Oregon Roads.—Grading is reported begun on a new line to be built from Lents to Gresham, Ore., a distance of 5½ miles. The right of way has been cleared for the entire distance.

Pennsylvania.—An officer denies current press reports that electric motive power is to be installed on the local trains between Pittsburgh and Pitcairn, Pa.

Pine Bluff & Western.—A meeting of the stockholders has been called to vote on a proposed increase of capital stock with which to extend the line from Sheridan, Ark., to Benton, a distance of 22 miles. The line was completed to its present terminus at Sheridan last winter. W. D. Radford, Pine Bluff, Ark., is Chief Engineer and General Superintendent.

Pittsburgh, Johnstown, Ebensburg & Eastern.—It is said that this line, which is now in operation between Phillipsburg and Fernwood, Pa., 17 miles, will be extended to Johnstown, Pa., 43 miles beyond.

Progreso-Merida (Yucatan).—Building is reported begun on a narrow gage line between these points in Yucatan. The corporate name is the Compania de Muelles & Almacenes de Progreso.

Raleigh & Western.—Surveys are reported between Harper's Cross Roads, N. C., on the present line, and Ramseur, on the Southern, 12 miles northwest. Geo. C. McGregor, 903 Exchange Court, New York, may be addressed.

Rochester, Syracuse & Eastern (Electric).—The New York State Railroad Commission has granted this company permission to build an electric line between Syracuse and Rochester, a distance of about 90 miles. It is said that work will be begun at once and that the road will be opened in 1904. Twenty-five towns and 21 villages will be reached. The company was incorporated at Albany in November, 1901, and a large amount of money has been subscribed to aid the building of the line. Lyman C. Smith, of Syracuse, is President.

Rossville & Eastern (Chicago & Eastern Illinois).—The Rossville & Eastern, incorporated in Illinois Aug. 13, is said to be in the interest of the above. According to most recent advices, surveys have been made and grading is in progress and will be completed by the first of November. The purpose of the company is to build a line about 12 miles long to reach coal fields just over the Indiana boundary. (Aug. 22, p. 664.)

St. Louis & Northwestern.—An officer is quoted as saying that contracts for this projected line from Brookfield, Mo., to a point on the Missouri, Kansas & Texas will be let in about 60 days, when present surveys are finished. Dr. J. H. P. Baker, of Salisbury, Mo., is President, and J. G. Gallemore is Secretary. (July 18, p. 580.)

Salem & Eastern.—Articles for incorporation for this company were filed in Arkansas Aug. 26. It is proposed to build from Salem in an easterly direction to a point on the St. Louis & San Francisco in Fulton County. R. A. Youngblood and others, of Salem, are the incorporators.

South Carolina & Georgia Extension.—Surveys are reported for an extension from Marion, N. C., the present terminus of the line, across the Blue Ridge to Bristol, Tenn., a distance of about 65 miles direct.

Sterling, Dixon & Eastern.—Articles for incorporation for this company were filed in Illinois Aug. 25. It is proposed to build between the points named, a distance of about 100 miles. The incorporators are Henry C. Higgins, of Neenah, Wis.; A. Hampshire, of Chicago, and others.

Susquehanna, Bloomsburg & Berwick.—An officer writes that surveys are completed for this projected railroad in Pennsylvania, and that it is expected that contracts will be let during September. The character of the work is of medium difficulty, with a maximum grade of 1 per cent. and curves of 10 deg. One steel bridge 176 ft. long, and one steel bridge 100 ft. long is involved. There will be no important trestles or tunnels. Two thousand two hundred tons of rails will be required; also a small amount of rolling stock. The company's map is not yet completed, but the distance from Bloomsburg to Berwick along the river is about 13 miles. The Delaware, Lackawanna & Western operates a line between these points at the present time. S. B. Haupt, General Manager, Watsontown, Pa., may be addressed.

Texas Roads.—A meeting of citizens was held at Garden Valley, Texas, on Aug. 20, to promote the building of a railroad from Tyler northwest to Smith, Van Zandt and other counties. A local railroad committee consisting of J. K. Herring, M. E. Fowler and others, was appointed to co-operate with the Tyler Commercial Club in aiding the movement.

Toledo, Angola & Western.—Application for privilege to cross country roads is now being made by this company. Further advices as to its plans indicate that nine miles of track will be built at once to connect the new glass works at Silica or Glanntown, Ohio, with the Terminal Belt Line of Toledo. The line as projected covers about 65 miles through Lucas, Fulton and Williams Counties, Ohio. James J. Robison, Toledo, Ohio, may be addressed.

Tuskegee.—The short line connecting Chehaw and Tuskegee in Alabama, five miles apart, is to be extended into the business district of Tuskegee. The railroad has heretofore been owned privately, but it is proposed to organize a stock company and improve the property. Declaration of incorporation has been filed and a commission to sell stock has been issued to E. T. Varner, W. H. Wright and W. G. Swanson, of Tuskegee.

Wabash.—It is said that plans have been presented to the citizens of Washington, Pa., by this company for a branch which it is proposed to build to Washington and Greene Counties, into the West Virginia coal fields, and that a committee of citizens has been selected to co-operate with the railroad.

Western Maryland.—It is understood that surveys have been recently completed for grade reduction by means of a tunnel through the Blue Ridge mountains. The proposed tunnel will start from a point near Emmettsburg and extend through the mountains to a point in Franklin County near Buena Vista. (Aug. 29, p. 682.)

## GENERAL RAILROAD NEWS.

Akron & Barberton Belt.—The first mortgage made by this company to the United States Mortgage & Trust Co. as trustee, secures 4 per cent. gold bonds not to exceed $1,500,000, to run for 40 years from June 1, 1902, but subject to call after Dec. 1, 1903, at 105 and interest, but only for the sinking fund to which will be paid annually an amount equal to 1 per cent. of all bonds issued, in addition to the interest on any bonds retired by the fund. Of the authorized sum, $900,000 has been applied to retire stock and bonds of component companies: $100,000 for betterments and $500,000 reserved for future needs.

Boston Elevated.—The Massachusetts Railroad Commissioners issued an order on Aug. 23 granting the company's petition for authority to issue $3,300,000 of additional capital stock. The Board specifies the use to be made of these funds as follows: For necessary cost of building the elevated structure, including foundations, electric system, etc., not to exceed $806,500; for building and equipment and power stations, not to exceed $296,800; for building and equipment of terminals and other stations, exclusive of land, not to exceed $471,000; for rolling stock, not to exceed $580,500; for equipment of subway, not to exceed $69,700; for engineering and miscellaneous expenses, not to exceed $161,300; for real estate and damages caused by building, not to exceed $862,500; for machinery, tools and miscellaneous equipment not to exceed $51,600, all of these figures being par quotations. Any surplus and proceeds of stock over and above the amount actually required as specifically named, shall be held subject to further order of the Board. It is also ordered that the value of new shares of stock at which they shall be offered proportionately to stockholders, pursuant to law, is $155 per share. At a special meeting of the stockholders July 25, an increase in the capital from $10,000,000 to $15,000,000 par value was authorized.

Denver, Northwestern & Pacific.—See Railroad Construction.

Detroit Southern.—Formal merger of the Iron R. R. with this company has been made. The Iron R. R. is now 13 miles long, running between Ironton and Center, Ohio, with branches which bring the total mileage to 18. Extensions are to be made. An officer is quoted as saying that a connection will be established with the Seaboard Air Line by means of the South & Western from Ironton.

Illinois Central.—At a special meeting at Chicago Aug. 29 the proposition to increase the capital stock from 792,000 shares to 950,400 shares of $100 each, was approved by the stockholders, thus making the entire capital stock of the company $95,040,000. It was also voted that each shareholder of record Sept. 19, 1902, should have the privilege of subscribing at par for one share of new stock for every five shares of stock registered in his name. The option expires on Oct. 24, 1902. (July 18, p. 580.)

Purchase from the Morgan Line of the Southern Pacific is reported of the steamships "Chalmette" and "Excelsior," which formerly run between New Orleans and New York. A new service from New Orleans to Havana is to be inaugurated with these ships, the first trip to be made from New Orleans on Oct. 1.

Kansas & Southern.—This road, which runs between Blaine and Westmoreland, Kan., 10 miles, has been placed in the hands of a receiver on application of the Township Board of Rock Creek because its owners who reside in Kansas City, had discharged the employees and given notice that operations would be suspended indefinitely. The township owns bonds in the road. The property is now said to be under guard by both sides.

Midland (Nova Scotia).—A meeting of shareholders was held at Montreal Aug. 20, to authorize the cancellation, with the consent of the holders, of the bond issue now existing, and to authorize a new issue to the amount of $1,000,000. Additional common stock to the amount of $1,000,000, and preferred stock to the amount of $800,000, is also to be issued. The company now operates a line between Windsor and Truro, N. S., 58 miles. Wm. Strachan, Montreal, is President.

Northern Securities.—Answers were filed in the office of the United States Circuit Court at St. Paul, Minn., Sept. 1, by the defendants in the merger suit brought by the State of Minnesota. The suit was brought by the State against the Northern Securities Co., James J. Hill as President of that company, James J. Hill as an individual, the Great Northern Co., and the Northern Pacific Co., in which the allegations are generally denied. (April 18, p. 296.)

Ohio River & Western.—The name of the Bellaire, Zanesville & Cincinnati has been changed to the above. This is a narrow gage road which has been in the hands of a receiver for nine years, but is now to be reorganized. An officer informed us some time ago that the work proposed involved standard gaging of at least a portion of the line, and perhaps the building of a new line, but that definite arrangements had not been completed. The Bellaire, Zanesville & Cincinnati extends from Bellaire to Zanesville, Ohio, a distance of 112 miles, and James K. Geddes is Receiver and General Manager.

Queen & Crescent.—The New Orleans & Northeastern, which runs from Meridian, Miss., to New Orleans, La., 196 miles, and serves as the New Orleans end of the Queen & Crescent Route, has filed a mortgage for $8,000,000 to the Farmers Loan & Trust Co. of New York. A portion of the proceeds will be applied to retire the outstanding 6 per cent. bonds, and the remainder will be used for improvements. Further details are not at present obtainable.

Salt Lake & Brigham City (Electric).—At a meeting of the stockholders Aug. 26 the change in capitalization from $200,000 to $1,000,000 was authorized and other details were arranged to permit of building at once. The proposed line will be about 60 miles long, running between the points named by way of Ogden, and will parallel the Oregon Short Line. (See under Railroad Construction Aug. 15, p. 650.)

Southern.—A circular has been sent to the stockholders by J. P. Morgan, Chas. Lanier and G. F. Baker, the voting trustees, advising an extension of the voting trust until Oct. 15, 1907, in the interest of the negotiations now pending for the further development and strengthening of the company, etc. The *Commercial and Financial Chronicle* gives an abstract of the circular in which, among other statements, it says that: The events of the last 18 months in connection with railroad properties have revealed the danger to which corporate properties are exposed of the control of their stock being bought up in the market by purchasers not identified with the property or permanently interested in its development and improvement. Therefore we do not hesitate to state that, in our opinion, it is decidedly for the interests of the stockholders of the Southern Ry. to protect their property by an extension of the voting trust until negotiations now pending for the further development and strengthening of its lines shall be settled beyond any risk of being overturned, and until the completion of other negotiations now pending in relation to transportation interests in the Southern States which have an important bearing upon the interests of the Southern Ry. Co.